

THE *Refrigeration*

Industry

APRIL, 1935

ICE MAKING
WATER PURIFICATION
REFRIGERATION

AIR CONDITIONING
WATER PURIFICATION



★ ★ ★ ★ ★

IN THIS ISSUE: { The World's Largest Low Temperature Plant
Refrigerators that Float . . . Quiet, Please
Horse Sense on Horsepower . . . About Face!



A PUZZLE FOR OUR SCIENTISTS...

Weatherhead

Firsts

Solving Problems
for Industry

*
ERMETO FITTINGS

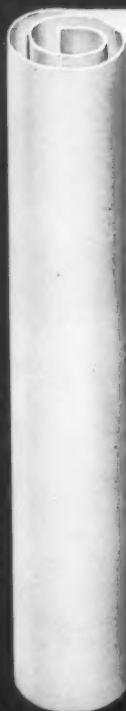
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Q-A HOSE END
FITTINGS

*
BRAZED STEEL
FITTINGS

*
HYDRAULIC BRAKE
LINES AND
BRAKE FITTINGS

*
FIRE-RESISTANT
HOSE ASSEMBLIES

*
THE WEATHERHEAD
T-RING PACKING



HOW TO SAVE YOU A PENNY

HAVE you thought much about performance of small parts in new peacetime products—and how much these parts cost?

Countless times since 1919 Weatherhead has been assigned the job of saving "a penny a part" for a manufacturer—and has solved the puzzle and delivered a finer part in the bargain. At Weatherhead this kind of thinking begins at the beginning—in the laboratory—where a steadily growing staff is trained to consider engineering, production

and marketing factors all as interlocking parts of each job at hand.

One of many examples:—When hydraulic brakes were adopted for the automobile, Weatherhead developed a hydraulic brake line only one-half the size of those previously used, and produced it for less cost to the automotive industry.

That's why we can say, "Look ahead with Weatherhead." We invite you to write our Sales Engineering Department for assistance in solving your postwar parts problems now.

Look Ahead with



FREE: Write on company letterhead for "Seeds Of Industry" —

24-page illustrated story of Weatherhead facilities and products ready to serve you.



Weatherhead

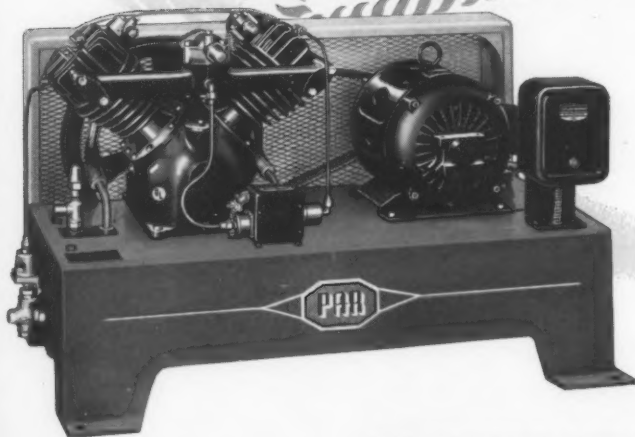
THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO

Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada — St. Thomas, Ontario



PAR Gives
"BLANKET COVERAGE"
in Models and Sizes for
Economical, Efficient Refrigeration
FROM 1/6 TO 5 H.P.

PAR BY *Lynch*



YOUR Par Jobber has Complete details on the Par line of Condensing Equipment. See him for full information or write for Par catalogue R-96 and supplement R-96A.

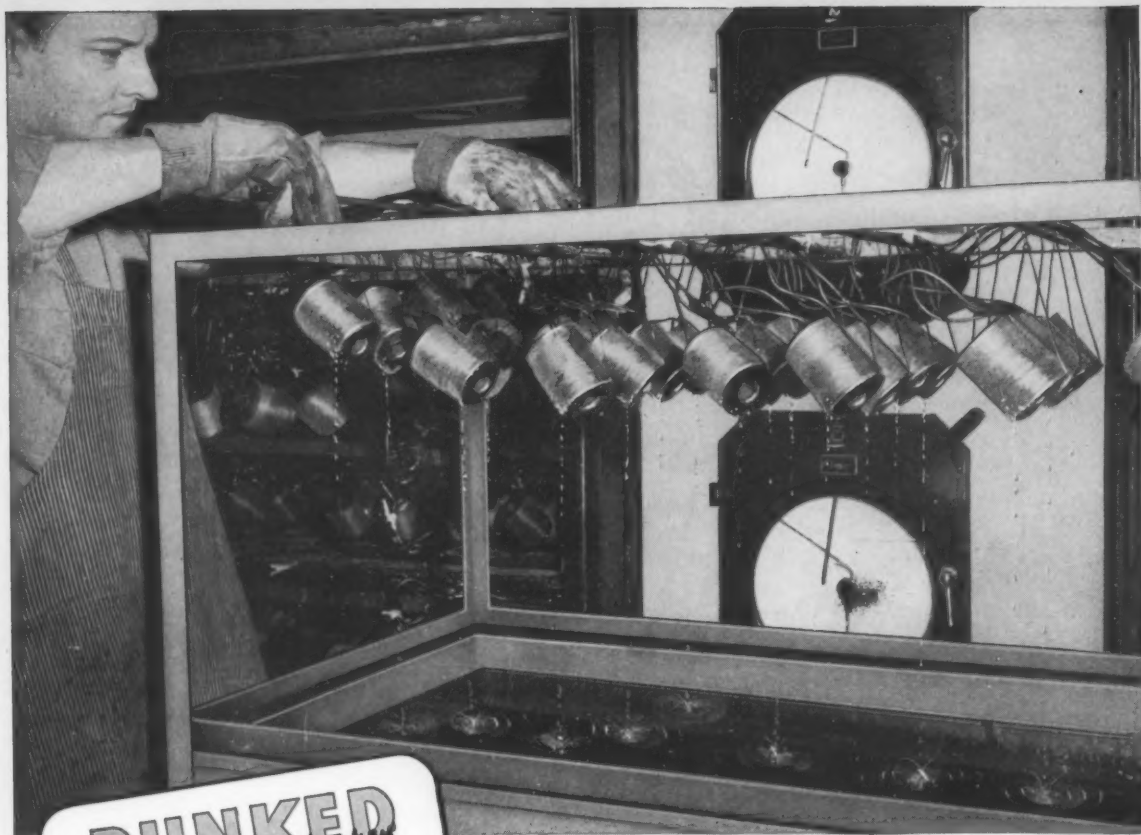
PAR—Condensing Unit Line sold exclusively through Franchised Refrigeration Supply Jobbers!

PAR
Lynch
 DIVISION

... By Comparison — You'll Buy PAR

Manufacturing Corporation, Defiance, Ohio
U. S. A.

APRIL, 1945



**DUNKED
IN GOO**

Sounds like a sticky procedure, but it means more dependable solenoid performance

Yes, it's actually dunked in goo. The "goo" is the finest insulating varnish available, and into it, for a good "dunking," goes every coil intended for an Alco Solenoid Valve.

During the "dunking" process, the insulant finds its way into every tiny crevice of the coil, efficiently sealing it against moisture.

After several "dunkings" and trips through the

baking ovens, plus a series of exacting tests to insure efficient insulation, the coil is ready for installation in your Alco Solenoid Valve.

This thorough insulation is another reason why Alco Solenoid Valves can be depended upon for the trouble-free performance that gives you efficient refrigeration. See your Alco jobber, Alco Valve Company, 843 Kingsland, St. Louis 5, Mo.



ALCO VALVE COMPANY

Designers and Manufacturers of Thermostatic
Expansion Valves; Pressure Regulating Valves;
Solenoid Valves; Float Switches; Float Valves.
843 Kingsland Avenue • St. Louis 5, Mo.



Get The RIGHT Gauge In The RIGHT Place

CAN YOU AFFORD TO DIFFER WITH THE EXPERTS?

Make Sure it's a USG —
There's One for Every Purpose

Hydraulic Equipment
Compressed Air Equipment
Automotive Equipment
Spraying Equipment
Boilers
Heating Equipment
Air Conditioning Equipment
Welding Equipment
Gas Regulators
Oil-Well Drilling Equipment
Chemical Equipment
Refrigerating Equipment
Pumps
Special Equipment
Railroad Equipment
Mining Equipment
Diesels
Oil Burners
Marine Equipment

There need be no guesswork in selecting gauges today, whatever type of equipment you make or operate. A sure signpost to guide you is the preference shown by the majority of manufacturers. Actually more than 6 out of 10 install U. S. Pressure and Vacuum Gauges on the equipment they make.

These men—experts in their respective fields—take no chances with questionable products. They long ago tested, accepted and standardized on U. S. Gauges.

Their repeat orders signify continued faith in the accuracy, durability and uniform reliability of these famous gauges.

To get the *right* gauge in the *right* place, follow the judgment of the experts, the original equipment manufacturers . . . specify U. S. Gauges.

A DISTRIBUTOR NEARBY

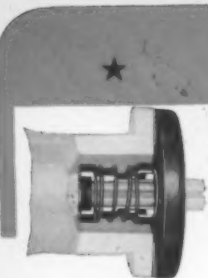
Your local supply house stocks or will get the U. S. Gauges you need in a jiffy. Why accept any other make when you can have the best for no more?

UNITED STATES GAUGE COMPANY, SELLERSVILLE, PA.

USG

UNITED STATES GAUGE

Manufacturers of Pressure, Temperature, Flow, Vacuum and Level Measuring Instruments



UNIT 3215

★ ROTARY SEAL

REPLACEMENT
UNITS

STOCK LIST NO. 3 • THE ENTIRE LINE WILL BE
FEATURED IN THREE SUCCESSIVE ADVERTISEMENTS OF WHICH THIS
IS THE THIRD.

EVERY **ROTARY SEAL** REPLACEMENT UNIT HAS ITS OWN INSTRUCTION
SHEET WITH AN ILLUSTRATION AND A DETAILED EXPLANATION OF THE INSTALLATION
PROCEDURE . . .

Make of Compressor	Shaft Size	Stock No.	List Price
NORGE	5/8"	3212	3.70
Slotted Shaft, 6 Bolt Holes. Diameter Bolt Hole Circle 2-5/8". Models: K. Counterbore for bellows seal flange extends into bolt holes.			
NORGE	5/8"	3215	3.70
Slotted Shaft, 6 Bolt Holes. Diam. Bolt Hole Circle 2-5/8". Models: 1933-ABC400, 1934-ACC400, 1935-ACC400B, 1936-ACC400B, NA25, NA33, NW33, Rollator No. 240-used on 1/4 H.P. to 1/3 H.P. domestic and commercial units. A, AP, D, I, JP, K, KP, M, R, W.			
NORGE	11/32"	3200	3.70
5 Bolt Holes. Diam. Bolt Hole Circle 2". Models: Rollator 30000, 1930-1931.			
NORGE	21/32"	3205	3.70
5 Bolt Holes. Diam. Bolt Hole Circle 2-7/16". Models: 1931, 1932, 1933.			
NORGE	3/4"	2207	2.90
Models: NA50, NA75, NA100, NA1500, NW50, NW75, NW100, Rollator No. 828-used on 1/2 H.P. to 1-1/2 H.P. units inclusive. Replaces original seal XCS71.			
PAR	11/16"	2380	2.90
5 Bolt Holes. Diam. Bolt Hole Circle 2-9/16". Models: S-15.			
PAR	13/16"	4355	4.50
5 Bolt Holes. Diam. Bolt Hole Circle 2-1/2". Models: 25, 50.			
PAR	31/32"	6357	6.80
5 Bolt Holes. Diam. Bolt Hole Circle 3". Models: 100, 200.			
PAR	1-1/4"	9359	9.40
5 Bolt Holes. Diam. Bolt Hole Circle 3-3/4". Models: 500, 1000.			
RICE	1/2"	4155	4.50
4 Bolt Holes. Diam. Bolt Hole Circle 2-13/16".			
RICE	21/32"	4330	4.50
3 Bolt Holes. Diam. Bolt Hole Circle 2-1/2".			
SANITARY	9/16"	2381	2.90
6 Bolt Holes. Diam. Bolt Hole Circle 2-3/8". Replaces diaphragm seal.			
SANITARY	11/16"	2382	2.90
For compressors having threaded cap.			
SANITARY	5/8"	2380	2.90
5 Bolt Holes. Diameter Bolt Hole Circle 2-9/16" (unevenly spaced).			
SERVEL	3/4"	5305	5.90
10 Bolt Holes. Diam. Bolt Hole Circle 4-3/8". Models: HIGHSIDE MODEL No. 1, 2, 4, 5, 8, 15, 15A, 18, 18A, 21, 21A, 22, 22A, 24B, 24C, COMPRESSOR MODEL No.: R100B, R1063, R1063D, R1098, R1098B, R1098C, Replaces Graphite Seal on Twin Cylinder. Applicable only to Servel compressors using the multiple Disk Type seal and having a 3/4" shaft.			
SERVEL	3/4"	5307	5.90
10 Bolt Holes. Diam. Bolt Hole Circle 4-5/8". 3/8" Bearing Bolts. Models: HIGHSIDE MODEL No.: 50A, 50AW, 50B, 50BW, 50D, 50DW, 50E, 50EW, 65A, 65AW, 75B, 75C, 75DW, 75D, 75EW, 75FW, COMPRESSOR MODEL No.: R1694B, R1694C, 1-30, 1-54, 1-43, 1-56, 1-42, 1-52, 1-53, 1-18, 1-40, 1-50, 1-55.			
SERVEL	3/4"	5310	5.90
10 Bolt Holes. Diam. Bolt Hole Circle 4-3/4". Models: HIGHSIDE MODEL No.: 23A, 24A, 75A, 75AW. COMPRESSOR MODEL No.: R1064C.			
SERVEL	3/4"	5312	5.90
8 Bolt Holes. Diam. Bolt Hole Circle 3-7/8". Models: HIGHSIDE MODEL No.: 30A, 30AW, 30D, 30E, 30EW, 30F, 40AW, 40BW. COMPRESSOR MODEL No.: R20324, 1-41, 1-51.			
SERVEL	3/4"	3314	3.70
Single cylinder compressor—Outside seal 5 Bolt Holes. Diam. Bolt Hole Circle 1-15/16". Models: HIGHSIDE MODEL No.: 12A, 12B, 13A, 14A, 14C, 19A, COMPRESSOR MODEL No.: R20284, R20284B, 1-38, 1-29.			
SPANTON	21/32"	2230	2.90
6 Bolt Holes. Diam. Bolt Hole Circle 2-5/8". Models: 1935, 1936. Not applicable to direct drive compressor.			
STARR FREEZE	5/8"	3240	3.70
4 and 5 Bolt Holes. Diam. Bolt Hole Circle 2-5/8". Models: Fits all A and J models without counterbore in seal housing—years 1929-34.			

Make of Compressor	Shaft Size	Stock No.	List Price
STARR FREEZE	5/8"	2246	2.90
Models: All compressors having counterbore in seal housing A, B, J after 1934.			
STEWART-WARNER	1/2"	2320	2.90
Twin cylinder horizontal. 6 Bolt Holes. Diam. Bolt Hole Circle 2-3/4". Models: 80200, 80001.			
STEWART-WARNER	5/8"	1115	1.90
Single and twin cylinder vertical. 6 Bolt Holes. Diam. Bolt Hole Circle 2-3/4". Model: 80600.			
TRUPAR	5/8"	2262	2.90
For all compressors using threaded cap.			
TRUPAR	3/4"	2265	2.90
For all compressors using threaded cap.			
UNIFLOW	5/8"	2233	2.90
For compressors having 4 hole plate.			
UNIFLOW	5/8"	2335	3.70
5 Bolt Holes. Diam. Bolt Hole Circle 2-1/2". Models: M45A, M60A.			
UNIVERSAL COOLER	5/8"	3282	3.70
For all compressors using threaded cap. Not an outside seal.			
UNIVERSAL COOLER	11/16"	3280	3.70
For all compressors using threaded cap. Models: B, C, D, E, F.			
UNIVERSAL COOLER	11/16"	4440	4.50
6 Bolt Holes. Diam. Bolt Hole Circle 2-5/8". Models: Replaces Outside Bellows Seal on Model A.			
UNIVERSAL COOLER	15/16"	5444	5.90
8 Bolt Holes. Diam. Bolt Hole Circle 3-1/4". Models: Replaces Outside Bellows Seal on Models AA, DD, FF, CD, 1/5 to 1/2 H.P.			
WAYNE	5/8"	3140	3.70
4 Bolt Holes. Diam. Bolt Hole Circle 2-1/2". Not applicable to those Wayne compressors having an undercut shaft. Models: CI, FI.			
WAYNE	5/8"	3142	3.70
6 Bolt Holes. Diam. Bolt Hole Circle 2-3/8".			
WELSBACH	5/8"	3165	3.70
4 Bolt Holes. Diam. Bolt Hole Circle 2-3/8". Models: 10, 20, 25, 28.			
WESTINGHOUSE	1"	6365	6.80
8 Bolt Holes. Diam. Bolt Hole Circle 2-9/16". Models: CAF 1501, CWF 1501. Twin cylinder 1-1/2 H.P.			
WESTINGHOUSE	1-1/4"	8366	9.40
8 Bolt Holes. Diam. Bolt Hole Circle 3-3/4". Seal space 1-3/8". Models: RW11.			
WESTINGHOUSE	1-1/4"	17367	17.00
8 Bolt Holes. Diam. Bolt Hole Circle 3-3/4". Seal space 13/16". Models: RW4.			
WESTINGHOUSE	2"	17364	17.00
6 Bolts. Diam. Bolt Hole Circle 4-9/16".			
YORK	3/4"	6223	6.80
6 Bolt Holes. Diameter Bolt Circle 3-1/8". Models: 3 cylinder, 91A.			
YORK	3/4"	14222	14.50
5 Bolts. Diam. Bolt Hole Circle 3-3/16". Models: Replaces diaphragm Balancesal, LG 3-127, 3/4 H.P. 419FA, 42FL.			
YORK	1-1/8"	14224	14.50
5 Bolt Holes. Diameter Bolt Circle 4-1/8". Models: 424FW, 42T8F. Balancesal diaphragm diameter 3-1/2".			
YORK	1-3/4"	30221	30.00
8 Bolt Holes. Diameter Bolt Circle 6-1/8". Models: 444FW, 10 H.P. Balancesal diaphragm diameter 5-5/16".			
ZEROZONE	1/2"	4155	4.50
4 Bolt Holes. Diam. Bolt Hole Circle 2-13/16". Model: D.			
ZEROZONE	5/8"	1115	1.90
4 Bolts. Diam. Bolt Hole Circle 2-9/16". 6 Bolts. Diam. Bolt Hole Circle 2-3/8". Models: A, A2, F, L2, F2, SC, TS, TC, H, S, T.			
ZEROZONE	3/4"	4162	4.50
6 Bolt Holes. Diam. Bolt Hole Circle 3-1/4". Models: A-S, G, I, K, N, W-S, WG, WI, WK, WR, WT.			
ZEROZONE	7/8"	6163	6.80
6 Bolt Holes. Diam. Bolt Hole Circle 3-3/4". Models: I, R.			



ROTARY SEAL COMPANY

2020 North Larrabee St.

Chicago 14, Ill.

THE REFRIGERATION INDUSTRY



The man-on-the-job likes **ANACONDA CUP-SEALED* TUBES**

It's A SMALL THING perhaps, this Cup-Seal that keeps Anaconda Refrigeration Tubes dry, protects the bright, clean inside surface, saves waste and makes it easy to run tube through openings but little larger than the tube itself. But those things mean a lot to the man-on-the-job. They add up in minutes saved and in the kind of work that builds customer good will.

Perhaps this exclusive Cup-Seal is

why more and more service men are asking for Anaconda Dehydrated Copper Refrigeration Tubes. *Patent Applied For

Anaconda Copper Refrigeration Tubes, (99.9+ percent pure), are manufactured in accordance with A.S.T.M. Specifications B68-43. They are available in all standard sizes up to and including $\frac{3}{4}$ " O.D. and are stocked by distributors in 25, 50 and 100-foot coils. Longer lengths on special order.

BUY WAR BONDS . . . BUY ALL YOU CAN . . . KEEP ALL YOU BUY!



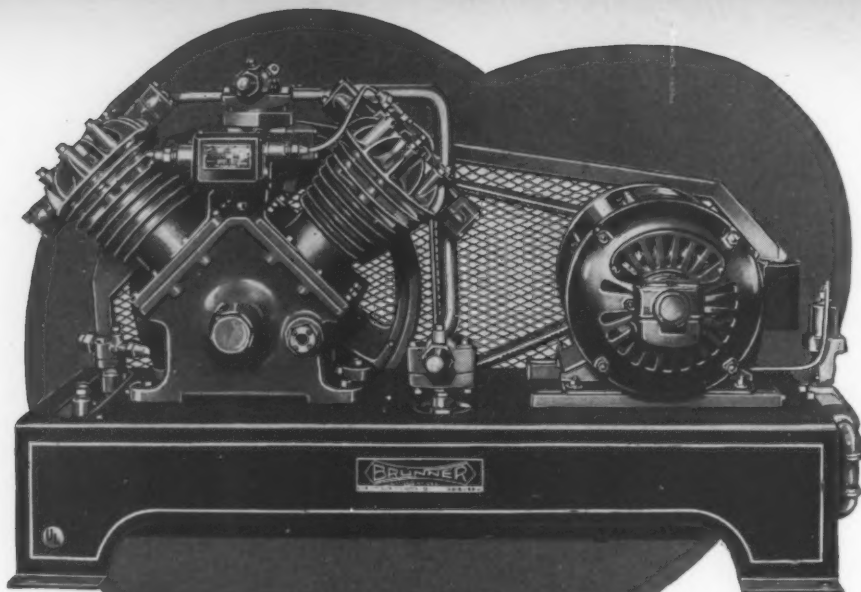
Anaconda Refrigeration Tubes

FRENCH SMALL TUBE BRANCH—THE AMERICAN BRASS COMPANY

Subsidiary of Anaconda Copper Mining Company—General Offices: Waterbury 88, Connecticut

In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario

46391



The Heart of the Refrigeration System...

THE CONDENSING UNIT



Manufacturers of all types of refrigerated cabinets are aware of the post-war trend in merchandising perishable foods. Many designs of show cases, cabinets, quick frozen food boxes, and reach and walk-in boxes have passed the drawing-board stage.

The utility of the finished refrigerated cabinet is no better than its condensing unit—the heart of the refrigeration system.

More than 37 years experience in the design and production of compressors, during peace and war times, back every Brunner condensing unit. Brunner engineering has kept step with that of the cabinet designers, regardless of how

streamlined the cabinet might be. The closer tolerances required by the necessities of war have enabled Brunner to produce refrigeration condensing units that meet all improvements and refinements of design. Brunner engineers have cooperated with the designers and manufacturers of cabinets in arriving at a proper design of both cabinet and condensing unit to assure the proper amount of refrigeration for each type of cabinet.

Remember, the heart of your refrigeration system is its condensing unit. To assure reliability, efficiency and economy, specify Brunner Refrigeration Condensing Units. Brunner Manufacturing Company, Utica 1, New York, U. S. A.



**FOR OVER 37 YEARS
THE SYMBOL OF QUALITY**



Honeywell has the answer! Temperature controls for high or low temperature ranges — Pressure controls, both light and heavy duty — Room type thermostats to meet any specification — Control accessories which provide full flexibility of application. Some Honeywell Refrigeration Controls are equipped with mercury tube switches, some with open contact snap switches depending upon the design application. There is just the right Honeywell Control for every job. Honeywell branches and jobbers are conveniently located in all parts of the country. Factory trained engineers are ready to assist you with your control problems. Call them or write: Minneapolis-Honeywell Regulator Company, 2909 Fourth Avenue South, Minneapolis 8, Minnesota — Manufacturers of the famous Polartron System of Frost Free Refrigeration.

MINNEAPOLIS
Honeywell
 CONTROL SYSTEMS

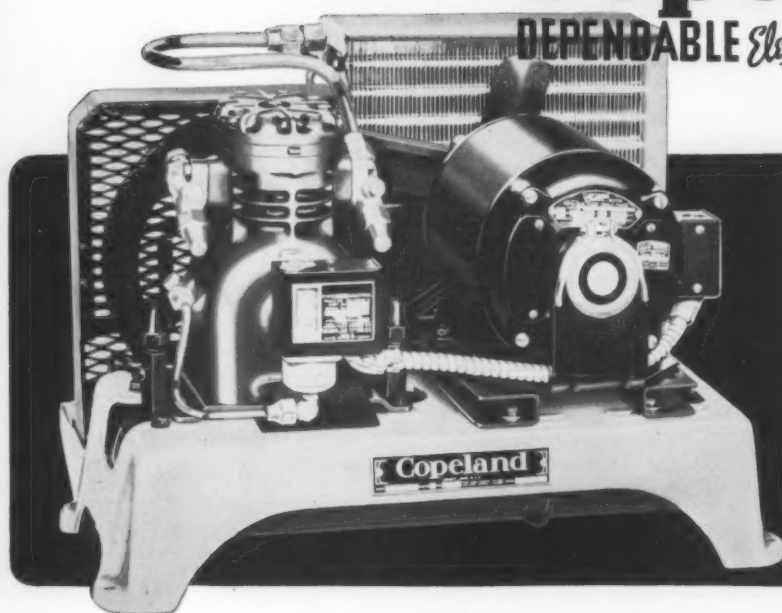
The Polartron
 System of
 Frost-Free
 Refrigeration

First

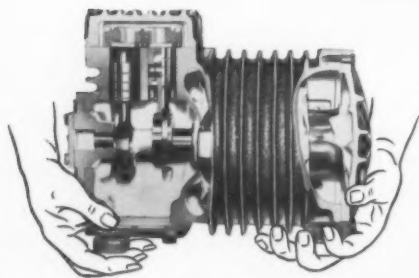
... with Practical Ideas —

Copeland

DEPENDABLE *Electric* REFRIGERATION



*Ask for
the Complete
Copeland
Catalog*



COPELAMETIC
The Accessible Hermetic

Copeland can give you just the right size and type of refrigeration unit to meet the needs of any customer—and at the same time assure him low cost, trouble-free, dependable operation. With over twenty-five years of experience in refrigeration exclusively—constantly developing new ideas — Copeland offers units that cannot be excelled in engineering features or manufacturing precision.

COPELAND REFRIGERATION CORPORATION, SIDNEY, OHIO

7 REASONS WHY

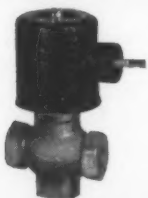
"DL" SOLENOID VALVES ARE PREFERRED

- 1 **POWERFUL**—Ample power to lift against high pressures.
- 2 **QUIET**—Design of plunger and guide tube minimizes objectionable A.C. hum.
- 3 **EASILY INSTALLED**—Substantial mounting boss on valve body makes for easy, rigid installation.
- 4 **EASILY SERVICED**—Can be disassembled and cleaned without disconnecting refrigerant lines or wiring.
- 5 **POSITIVE CLOSING**—Non magnetic needle and seat and strong "kick off" spring assure tight closing.
- 6 **LONG LIVED**—Valve bodies are of close-grained non-porous cast brass. Coils are of moisture-proof construction.
- 7 **ECONOMICAL**—Draw little current. Replacement parts if required are inexpensive.

Specify "DL" solenoid valves and take advantage of these features.

FOUR WIRE COIL

One of the features of "DL" solenoids preferred by jobbers and service men is the dual 115-230 volt 4 lead coil. This coil can be used on either 115V60 cycle or 230 volt 60 cycle current by connecting the 4 leads in the right sequence. Correct wiring diagram is shown right on the coil—a great time saver.



↑
No. 683-3—This reliable valve, like all "DL" solenoids is designed for use with any fluid that will not attack brass. Furnished with three sizes of orifices, 1/8", 3/16", and 7/32".

Nominal capacity—liquid line
 3/16" orifice 3 tons Freon 6-1/2 tons Methyl
 7/32" orifice 3-3/4 tons Freon 8-3/4 tons Methyl
 3/8" female N.P.T. connections.

→
No. 681—The No. 681 is of the pilot operated type and requires a minimum pressure drop of 1 p.s.i. to operate the piston.

Nominal capacity—liquid line
 7-1/2 tons Freon 17 tons Methyl
 1/2" female N.P.T. connections.



←
No. 686—The No. 686 is a heavy duty, large capacity pilot operated valve which requires a pressure drop of 1-3/4 p.s.i. to operate the piston when used with refrigerants, 5 p.s.i. on water. It is made with 2 sizes of orifices, 1/2" and 5/8"

Nominal capacity—liquid line
 1/2" orifice 11 tons Freon 23 tons Methyl
 5/8" orifice 17 tons Freon 34 tons Methyl

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG



"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Vent Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Lubricators



experience

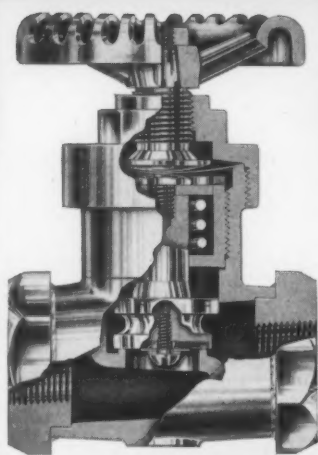
It takes years of engineering
experience to make good Air and
Water Cooled Condensing Units.
Mills can't be beat!

MILLS INDUSTRIES, INCORPORATED, 4100 FULLERTON AVENUE, CHICAGO 39, ILLINOIS



FOOD SHIPPERS...

... Will want the complete facts
about these new developments
for *faster, safer* food handling



Entirely refrigerated cargo ships speed foodstuffs to our fighting men—all over the world—to freed peoples in every land.

In postwar, these new developments will certainly be adapted to solid trainloads, fast highway trucks, yes, even transport planes in the air will speed fresh foodstuffs to world wide markets, safer and economically.

Kerotest engineers can help you in planning your equipment to capture these new profitable markets.

KEROTEST MANUFACTURING CO., Pittsburgh, Pa.

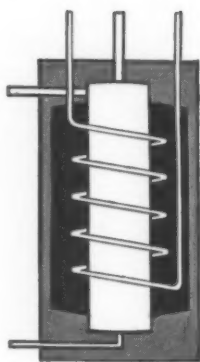
KEROTEST

PRECISION
ENGINEERED

VALVES

THERMOBANK

by
KRAMER



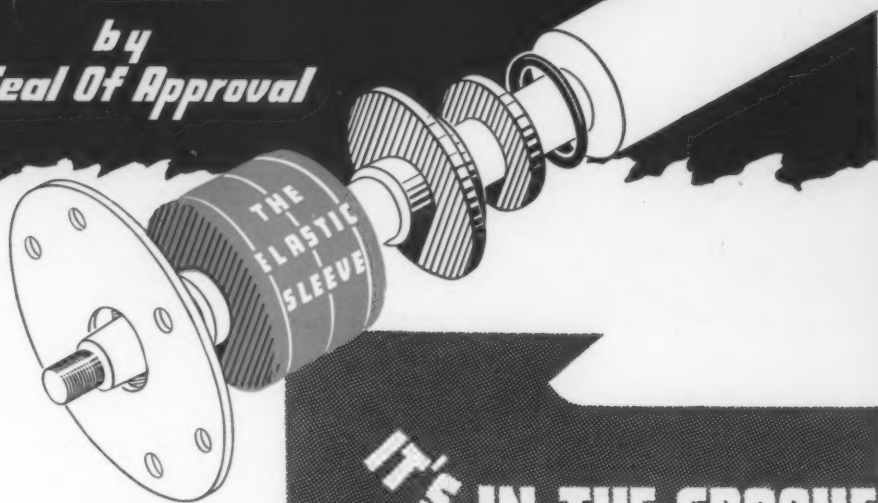
The only completely automatic refrigeration system for temperatures below the frost line without the use of electric heaters, water spray or brine spray.

Write for
Bulletin TV-345 R1

KRAMER TRENTON COMPANY
Trenton, New Jersey

INVASION OF REFRIGERATION FIELD

*by
The Seal Of Approval*



IT'S IN THE GROOVE

New Elastic Material Simplifies and Improves Design

The use of the recently developed tough, oil resistant and extremely resilient material used in the ELASTIC SLEEVE makes possible the elimination of manually compressing springs and other fragile parts formerly found in shaft seals thereby eliminating ordinary repairs formerly found necessary during operation which were costly in time, money, and manpower and breakage during the assembly operation.

The special design and material used in the ELASTIC SLEEVE assures a perfect fit to compressor shafts at all times. The 'O' ring used in the ELASTIC SLEEVE between the shaft end and the worn shaft has been used for some time by aircraft engine manufacturers as a hydraulic seal and has stood up under the most exacting conditions. As applied to the ELASTIC SLEEVE, perfect fit is assured at all times . . . the ELASTIC SLEEVE works equally well on bent, worn, slotted, or pitted shafts.

Due to the elimination of springs, shims, and shaft glands the ELASTIC SLEEVE has fewer assembly parts thereby simplifying installation and reducing possible breakage.

If your jobber cannot supply you, write directly to TEMPERATURE CONTROL DEVICES, New Haven 15, Connecticut, for your initial order, including your jobber's name and address. Don't delay—learn about this sensational development.

The new grooved feature as applied to the elastic material used in the ELASTIC SLEEVE assures a perfect pressure equalization through compensation for pressure surge . . . as the pressure increases, it enters the groove of the ELASTIC SLEEVE thereby causing expansion of the SLEEVE which compensates for any pressure encountered in this area. This assures a perfect seal at all times.

TEMPERATURE

Control Devices

NEW HAVEN 15, CONNECTICUT



Genuine
**UNIVERSAL COOLER
PARTS**

precision-built with original-
equipment skill and care, are
quickly available coast to coast
through these AUTHORIZED
JOBBERs.



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205 Commerce St.
Montgomery

ARKANSAS

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Little Rock

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ARIZONA REFRIG. SUP., INC.
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Phoenix

CALIFORNIA

REFRIG. SERVICE INC.
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Los Angeles 4

CALIFORNIA REFRIG. CO.
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Oakland

HINSHAW SUPPLY CO.
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San Diego

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TO HOLD
AS IT IS TO
BUY WAR BONDS

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MARION, OHIO • BRANTFORD, ONTARIO

THE REFRIGERATION INDUSTRY

THE *Refrigeration* INDUSTRY

VOLUME 2, No. 4

APRIL, 1945

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Protection...

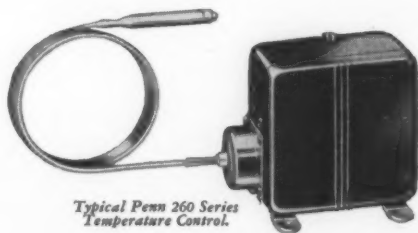
for critical food supplies!

• Things happen to even the best commercial refrigeration systems . . . little things, unimportant in themselves, but they can cause temporary suspension of required cooling, resulting in spoilage and waste of critical food supplies. To detect abnormal "warm-up," PENN has developed its *Auxiliary Alarm Contact Structure*, which warns *whenever temperature rise is excessive*.

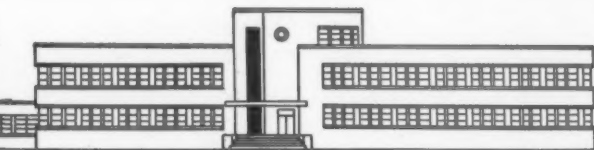
This extra precautionary measure is available in all standard temperature and pressure controls . . . providing added protection for *deep freezers and commercial low temperature boxes*. Its operation is extremely simple. A rise in temperature above the predetermined safe maximum causes the contacts to close . . . ringing a bell, flashing a light or

bringing some other warning device into operation.

Full details on the PENN Auxiliary Alarm Contact, together with other vital data on PENN refrigeration controls, are available in Penn Bulletin R-260. Write *Penn Electric Switch Co., Gosben, Ind.* Export Division: 13 E. 40th Street, New York 16, U.S.A. In Canada: Powerlite Devices, Ltd., Toronto, Ont.



PENN



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FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

BTU

News • Laws • Trends

● REPAIR CHARGES EYED

PRELIMINARY ACTION in a program designed to curb excessive charges to the public for repairs to household and other appliances has been announced by OPA.

Authority has been granted OPA's nine regional offices to require repair shops for these equipment groups that charge an hourly rate to customers to give detailed invoices in all cases and to keep detailed time records.

OPA said that complaints had been received that some repair shops, particularly those for household appliances, are charging exorbitant prices. Such shops repair electric irons, washing machines, refrigerators, vacuum cleaners, radios, etc.

The uniform pattern decided upon for use in any area action issued by OPA field offices sets forth these two requirements:

1. Detailed invoices must be supplied all customers, whether requested or not, and copies must be retained by the shop for inspection. The details required are listed and are for the purpose of showing actual hours charged customers and the basis for the time charged.

2. Shops must keep records showing the name of each employe doing repair work, the number of hours worked daily as well as during each pay period by each employe, and a separate statement showing how much of this work was performed on internal jobs for which no direct charge is made customers. Records also must be kept showing the amount of wages paid these employes in each pay period.

● LIGHTWEIGHT MODELS

PREDICTION THAT post-war refrigerators can be made with magnesium and thus be so light in weight that a housewife could by herself easily move one of them was made by N. H. Simpson, chemist of one of Consolidated Vultee Aircraft Corp.'s divisions, in a recent talk before the Magnesium Association in Cleveland.

This will be possible, Mr. Simpson said, through a new war production-inspired protective finish for magnesium, lightest known structural metal. One feature of the new finish is that it can be obtained in any color.

● MOTOR AUTHORIZATIONS

WPB's PROCEDURE in connection with authorizing manufacturers to accept deliveries of fractional horsepower motors and single phase 1 to 5 h. p. motors has

been revised. As a result of experience during the last two quarters, motor delivery acceptance authorizations will be made on an advance basis in the future. At present, both second and third quarters authorizations are being sent out. In the future, authorizations for at least two, possibly more, quarters in advance will be made. Order L-341 has been amended to put the new plan into operation.

● MANPOWER

CONCERN OVER THE DIFFICULTY of keeping mechanical refrigerator repair shops in the field adequately staffed with trained personnel was expressed by manufacturers' service managers at the recent meeting of the domestic mechanical refrigerator industry advisory committee.

Trained field service men, who are being drafted for military service in increasing numbers, are extremely difficult to replace, committee members reported. They pointed out that replacement personnel, if obtained, cannot be given sufficient training before summer, when service demands are expected to reach an all-time peak because many refrigerators have passed their normal life expectancy but cannot be replaced and therefore must be kept in operation.

● HOW DEALERS HELD ON

OF 17,000 DEALERS covered by Hotpoint in a recent survey, 93.2 per cent indicated they would be back selling electric refrigerators as soon as they are available. A surprise favorite among post-war products was room coolers, with 52.5 per cent of dealers replying to the survey declaring their intention to add it to their lines.

Dealers reported adding such lines as paint, furniture, glassware, floor coverings, wall paper, luggage—even used cars—as a means of staying in business when there were no appliances to sell. And 80 per cent of them said they intended to keep on with the substitute lines after the war—in addition to appliances, of course.

As another interesting sidelight of the survey, 12 per cent of the dealers covered reported they had set up servicing departments during the wartime period, when prior to the war they had not handled any of this type of work.

● DISPLAY CASE QUOTAS

QUOTAS TOTALING MORE than 7,000 refrigerated display cases have been granted to 33 manufacturers by the Refrigeration Section of WPB. Authorizations were under Direction 3 to Order L-38.

Exact number assigned to each producer was not given. Restrictions under which the cases are to be sold will be administered by WPB field offices. Indications are that the equipment will be held for sale on rated orders and for replacement only.

Following are the firms authorized to produce cases: American Store Fixture Co., Fall River, Mass.; American Refrigerator Co., Philadelphia; F. A. Atherton Co., Worcester, Mass.; Birkenwald Co., Portland, Ore.; Com-

Continued on page 41

Refrigerators



"Father and son" of the floating food fleet. The BK unit (above) can be shipped knocked-down and assembled at island bases; the BRL concrete barge (below) is towed to its scene of action.

AMERICA'S answer to the problem of how to provide her sons fighting in the far Pacific war zones with fresh meats, vegetables and dairy products, has been the construction of a unique fleet of huge floating refrigerators.

Unlike any vessels ever built before, these sea-going ice boxes are either shipped, knocked-down, for assembly at island bases, or are towed across the Pacific. In addition to providing refrigerated space for storing and preserving perishable foods, a number of the vessels have equipment for making ice cream, bringing a touch of home to sweating jungle fighters.

Three of the ships—christened Hydrogen, Calcium and Antimony—were built by Concrete Ship Con-

structors, National City, Calif. Known officially as BRL's (for Barge, Refrigerated, Large), these ships, the only three of their kind in the world, cost \$1,120,000 each.

They are built of concrete, with shells 7 to 9 inches thick, and have neither frames nor ribs. The hulls are 265 feet long, with a 48-foot beam and a 17-foot 7-inch depth. The deck house, of heavy wood construction, is divided into compartments, one of which is for making ice cream. Five hundred gallons of ice cream can be made daily.

Operated by the Army Transportation Corps, the barges will be used solely in the southwest and western Pacific as floating chill-warehouses. Transportation Corps-operated small boats, used almost exclusively for

Fleets of sea-going iceboxes are Uncle Sam's answer to the problem of supplying our Pacific fighters with fresh foodstuffs

inter-island service, will pick up the cargo and deliver it to the troops, after the barges have been towed to their original destination.

The equivalent of 64 carloads of frozen meats can be stored in the barges' eight main holds at 12°F. Two main deck compartments each have a capacity of about 500 measurement tons of fresh vegetables, cheese, eggs and other perishable produce.

Eighty-four electric motors with capacities up to 150 h.p. turn out 440 volts of power for the barges' elaborate cooling machinery, and for the 12 blowers which provide a complete change of refrigerated air every four

minutes to all chill and freeze compartments.

Main refrigeration effect is supplied by a York 53-ton unit powered by a 125 h.p. G-E marine motor. Central portion of the deck house, 225 feet long, is virtually an enormous refrigerator, with walls heavily insulated, and massive refrigerator doors. Inside, a temperature of 32 to 36°F. will be maintained.

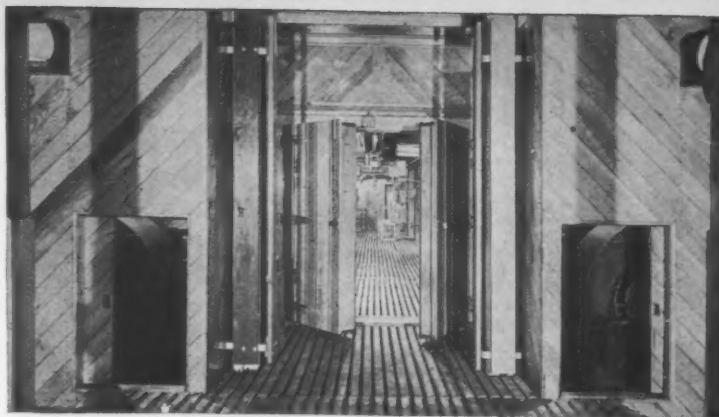
Below deck are eight holds, all insulated with Fiberglas affixed to the concrete shell and the bulkheads. In these holds, temperatures of 10 to 15°F. will be maintained for the length of a voyage to store meats, each hold being an individual freezing compartment. Total cargo capacity of the refrigerated space is 1000 tons.

A fleet of some 50 smaller refrigerator ships has been pre-fabricated by National Iron Works, San Diego, Calif.

Built in "knockdown" fashion and shipped in "package" form each craft constituting 368 "packages"—the 104-foot long vessels are shipped to assembly points overseas, where army men, simply by following company directions, bolt together portable panels in the field, and make water contact joints watertight by bolting with gaskets, cement and grommets. Then the refrigerated crafts are fitted out, with Fiberglas insulation (also shipped), sheeted over with Masonite and backed by wood framing fastened to the steelwork.

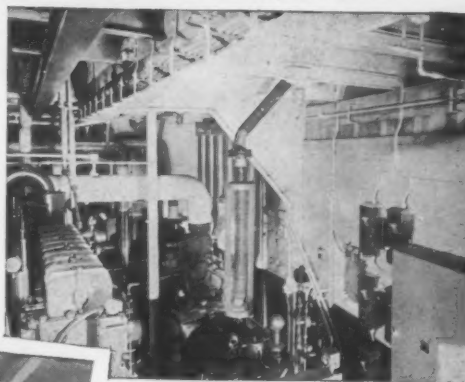
A completely fitted out refrigeration plant is sent along for these floating warehouses where perishables may be stored at newly won beach

Below—Installing bottom insulation between floor joists in one of the "knock-down" vessels.

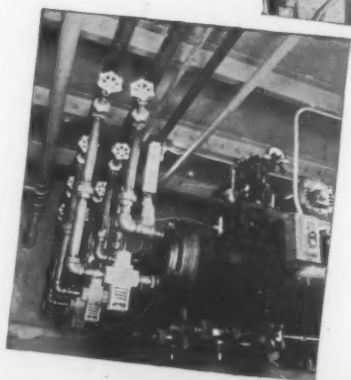


Here is a view of a refrigerated cargo compartment of one of the big BRLs, guarded by huge refrigerator doors. Fan compartments are shown in the immediate foreground. Cargo capacity of the BRL is 1000 tons.

Diesel-driven alternator used as standby in the big BRL food carriers. Over 50 tons of refrigeration is required.



Left—Detail of piping at port end of condensers and receivers in one of the smaller BK "knock-down" barges.



heads and insure supplies of meats and other fresh foods to fighting men who otherwise would have to depend on field rations.

Also in the packages shipped overseas are fire lines, circulating water lines, oil lines, electrical control and alarm circuits and complete living and cooking accommodations—toilet, shower, oil burning range, bunks, etc.

The flat-bottomed hull is 104 feet long, 29 feet wide and 8 feet deep. Mounted on it is a deck house, 85 feet long, 22 feet wide and 8 feet high. Atop this is the crew's quarters (for four), 15 by 17 feet.

Four cargo holds, each accessible by an individual hatch, are contained in the hull of the barge. Temperature here is maintained at 10°F. Above, in the deck house, are the daily issue and thaw rooms, where

Continued on page 62



By A. G. Weil

Refrigeration Maintenance Corp.
Chicago, Ill.

MOST refrigeration servicing shops doing any volume of work on unitary equipment will find definitely worth while the construction of a sound room for running tests on completed units, cabinets, and similar equipment.

From our experience in constructing several such rooms, we have settled on the one described below as being most efficient from an operating standpoint, as well as the most economical to build, considering results obtained.

Our present room has outside dimensions of 15x20 ft., but these, of course, may be altered to fit individual circumstances. This room was built in one corner of our shop, so that two of the building walls were used, necessitating only the construction of two side walls, doors, and a ceiling in erecting it.

Through consultation with acoustical experts, it was learned that a double wall of the so-called "floating type" would transfer the minimum amount of sound. Accordingly, the following method of construction was employed:

A 2x4 was laid upon the floor and nailed to it to form the base for each of the walls to be erected. A 2x4 was mounted for each wall parallel with the floor and 8 ft. above it. Upright lengths of 2x4's, 24 inches apart, were mounted between each 2x4 on the floor and the one parallel to it, 8 ft. in the air.

These 2x4's were mounted so that

1 in. of the 4 in. width protruded beyond the edge of the 2x4 on the floor and the 2x4 in the air. The uprights formed the supports on which 4 ft. x 8 ft. sheets of $\frac{1}{2}$ in. Celotex were nailed. This completed the outside wall of the room.

Another series of 2x4 uprights was mounted from the inside of the room, 24 in. apart, with 1 in. of the 4 in. width of the 2x4 protruding over the inside edge of the base 2x4 and top support. This second series of uprights was inserted between those uprights first erected, so that a vertical post was thus in position every 12 inches along the side walls.

Sheets of $\frac{1}{2}$ in. Celotex, 8 ft. x 4

A sound-proof room will help you plenty in doing better work—and you can build this one yourself!

ft., were nailed to the inside series of vertical posts. This then allowed the inside and outside walls to be independent of one another, as each sheathing of Celotex was nailed to its own set of 2x4's.

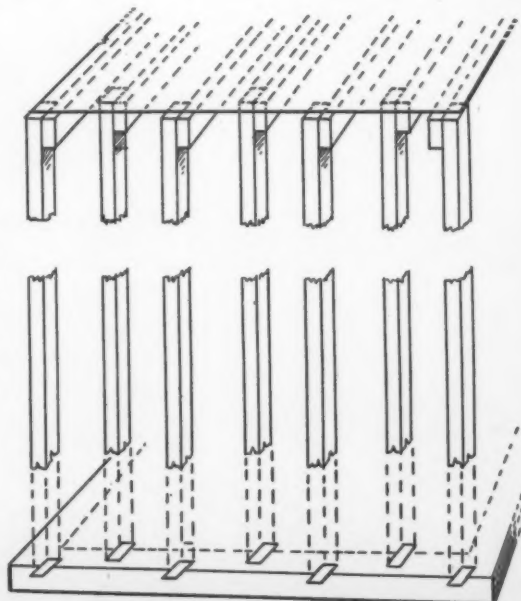
A total wall thickness of 7 in. was secured by this method: 4 in. for the width of the base and ceiling 2x4, 1 in. overhang for the outside uprights, and 1 in. overhang for the inside uprights, making a total thickness of 6 in. plus the two additional $\frac{1}{2}$ in. thicknesses of Celotex on the outside and inside walls.

The ceiling was then constructed in similar fashion to the side walls, with the protrusions of 1 in. on both the inside and outside of the room. Sheets of $\frac{1}{2}$ in. Celotex were then nailed to each side of the ceiling, providing a 7 in. thick cover.

In this room two doors were provided, one in each of the walls which were constructed. This spacing was allowed for at the time of construction and the 2x4 uprights staggered to provide these openings. A refrigerator cabinet can be wheeled in through one door, tested, and taken out through the other door, providing a

Continued on page 62

Detail of one end of sound room showing spacing of roof 2x4's (at top). Note how base of wall is designed to space accurately uprights every 12 inches and provide total wall thickness of 7 inches.



KEEPS EQUIPMENT

Young

WPB says old refrigerators must last--no new ones will be made until after V-E day

Your best working partner in the critical days ahead is Davison's Silica Gel. It lengthens the life of existing equipment because—

1. It Removes Acids and Corrosive Compounds from the refrigerant
2. It Will Not Attack Metals or Alloys

These two reasons alone give you assurance that Davison's Silica Gel is a factor in prevention of many of the breakdowns that are caused by "old age."

Order Davison's Silica Gel — in factory-charged dehydrators and for refilling—from your jobber.



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 Acts Instantly . . . Its Maximum Capacity is Not Affected By Oil . . . Prevents Channelling of Refrigerant Through Cartridge . . . Removes Acids and Corrosive Compounds from the Refrigerant . . . Chemically Inert and Non-Reactive—Will Not Attack Metals or Alloys.



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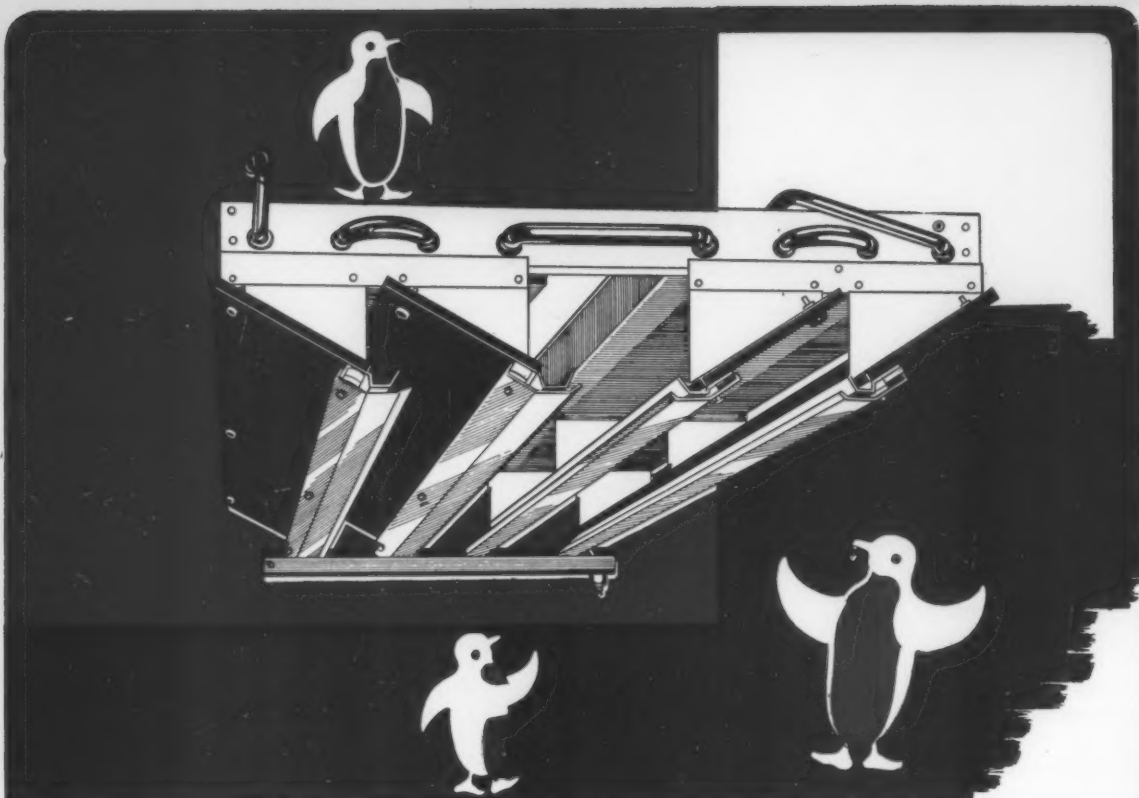


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APRIL, 1945

21



Bush Plasti-Cooler

Now Available — Faster Deliveries

A noteworthy contribution by BUSH to the refrigeration industry, the BUSH PLASTI-COOLER combines the efficiency of the famed Bush Finned Coil with the proved advantages of sturdy plastics . . . the original application of plastics to the low side field. Coil features aluminum fins spaced $1/3"$ — $1/2"$ — $3/4"$ and copper tubing ($5/8"$ to 100 lin. feet — $3/4"$ over

100 lin. feet). Baffles of gleaming, jet-black plastics eliminate all sweating . . . enhance appearance. Scientifically calculated pitching insures maximum cold air discharge. A choice of widths is available for different box sizes. The BUSH PLASTI-COOLER is the most modern evaporator at any price. For advanced engineering . . . BUY BUSH.



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ABOUT



FACE!

Pre-war, this dealer did servicing only; postwar, he'll be in there selling!



Preparing for postwar sales, the company recently bought the new building shown here.

THERE is more to refrigeration sales and service in the household field than meets the eye, and at least one dealer has put definite service rules into use while marking time for post-war sales.

J. A. Robertson, owner of Radio & Refrigeration Service Co., Mobile, Ala., has a definitely defined service policy, even to the method of answering the telephone. He has acquired a new building for post-war selling and while waiting for sales of household refrigerators to become possibilities, is making refrigeration service pay all the freight.

Mr. Robertson's post-war plans are almost an about-face from his pre-war business. Before the war he did considerable contract service work for refrigeration dealers, who did not maintain a service department. After the war he will retail aggressively in the household refrigerator field. He will place sales in charge of an experienced and trained sales manager, while he will continue to manage his business and superintend the service department.

Mr. Robertson's display floor is ready for post-war refrigerators. The lights are on, his list of prospects is



Above: typical shop equipment is shown in use; below, office and display floor ready for action.



open at the A's, and while waiting for the Victory whistle he is maintaining one of the best service businesses in the South.

He handles about 40 calls a day during four months of the year, and more than 10 calls per day during the remainder of the year—all on a cash basis.

Yet he never mentions or allows to be mentioned to a customer the letters "C.O.D." Mr. Robertson thinks C.O.D. has a bad connotation to the average individual.

When a job is ready to deliver, he phones the customer to find when it would be most convenient for him to call, mentioning the fact that the job will cost a certain amount of money. Calling up in advance saves precious gasoline. If it is a new customer he tells him that the rules for service work are cash or check on completion of the job. This is because (he tells them) nearly all of a service job is labor, and all labor is paid in cash; and parts are today the same as cash, and it is no more the custom of giving credit for refrigeration repair service than it is to have a charge account at the picture show.

The Money's Ready

Handled diplomatically, this allows the customer to set a time for him to return the refrigerator when the money will be ready. When that date is set, Mr. Robertson says the delivery must be made.

It's as simple as that, and Mr. Robertson says he has no trouble collecting and no embarrassing requests for credit. He charges enough to pay for a call-back or two if ever it is required, but takes every precaution to prevent need of any further service.

Mr. Robertson has made many refinements that add up to the reasons why his service business ticks in such musical tones.

He does not allow personal calls to go out over his service telephone, and has all conversation limited to three minutes. Why? Because all his business comes in over the telephone. He figures that a customer may try to get him twice when he gets a busy signal; but, nine times out of ten, on the third try he'll call another number.

He requires a record to be kept of every incoming telephone call. Name of the person calling, his address and business is entered in a book, together with when the call was an-

swered, even to the hour and minute. He can check every telephone call made to his place for two years back.

He knows how many times the telephone rings, and what times of the day and days of the week it rings the most.

Answering the telephone has been reduced to a science. Employees are instructed not to ask the customer what is the matter with his refrigerator.

Here is the telephone routine when a service call comes in:

Usually the customer asks: "Do



J. A. Robertson has made his ideas on refrigeration servicing pay the way

you repair refrigerators?"

The answer, of course, is "Yes" and the customer is asked: "What make?" Mr. Robertson services only household refrigerators, so if the answer indicates a commercial case, the customer is told the company does not handle this type of service.

The customer is then asked: "Does your refrigerator run all the time?" or "Does it not run at all?"

Answers to these questions are indicated on the service call record. This permits classifying the calls into three groups—electrical, mechanical, chemical.

He Groups the Calls

Grouping is the key to service, Mr. Robertson says, and each serviceman can take a group and accomplish more in a given time than if he is trying to service out of all three categories.

Mr. Robertson, who has been servicing refrigeration independently for more than ten years, has arranged his new service department especially for

the business, incorporating many ideas of his own.

An exhaust fan in a window will remove obnoxious fumes almost instantly. Nearby is a connected fire hose for small fires that may start. Grease rags are in closed container.

Shop Arrangement

Back door entrance of the service shop is wide and roomy. Truck unloading space at the back door is under a steel roofed shed which provides shelter from rain and shade in summer when it gets uncomfortably hot in Mobile.

His vacuum pump—the only one in Mobile, he says—is used to withdraw all the air when parts have been repaired. Sometimes it eliminates baking out parts; sometimes parts which have been repaired are heated slightly with a blow torch and the vacuum pump started—this keeps air out of lines and cuts call-backs.

The shop is equipped with fluorescent lights to kill the shadows, making less tiring repair on valves, seals and other close work.

Refrigerators are handled on dollies, the tool box is on casters, and his men work always on two, and preferably three, units at a time.

It is economical and sensible to work on two at a time, Mr. Robertson contends. On the first unit you can get it along to where it's time to run a test, or to check the throw of the thermostat, and while you are watching that one you can be working on the next one.

Repairs Motors, Too

As a matter of fact, if competition sends prices down in the post-war world, Mr. Robertson says he is prepared to service refrigerators on a line-production basis, that will allow a profit on production work.

Motor shops in Mobile became so crowded with business that they refused to accept fractional horsepower motors for repair. So Mr. Robertson set up a motor repair bench. He designed it for fool-proof operation, high speed testing. He repairs thermal relays, cut-out switches, and has arranged with a shop with machine rewinding equipment to rewind the field coils when needed. The rest of the work is done in his own shop.

He wired his test leads from the 110

Continued on page 63



Of course, your jobs have "what it takes"—but why do some of them take more than others? Here's your answer

Horse Sense on Horsepower

By GEORGE H. CLARK

A REFRIGERATION compressor receives energy from a motor of some kind. Part of the energy received is used up in overcoming the friction in the compressor itself, and part of it is used in compressing the gas and delivering it to the high pressure side of the system.

If the energy actually used to compress and deliver the gas is divided by the total energy delivered to the compressor, we would have a ratio which, taken in percentages, would be the mechanical efficiency of the compressor. Or, stated in another way, the total energy supplied, minus the energy lost in friction, divided by the total energy supplied, is the mechanical efficiency.

The energy delivered to the compressor is delivered as mechanical energy, or foot-pounds of work. This could be measured in terms of difference in belt tension in pounds, between the tight side of the belt and the loose side, and in feet per minute travelled by the belt, and pounds

ON HIS way back to the office after another one of those "high light bill" service calls, our hero, little Elmer, the super service man, got to thinking about the relationship between how much refrigeration was accomplished compared with electrical energy used.



To move 12,000 B.t.u. per hour for air conditioning takes about 1 h.p., the textbooks said—but what should it take to move 12,000 B.t.u. for a frozen food job?

For little Elmer—and others who are interested—we set forth here a method for determining how much power is required to drive a compressor and accomplish a definite rate of cooling.

times feet equals foot pounds of energy. One horsepower is 33,000 foot-pounds of energy per minute, or an energy rate.

The energy delivered to the compressor all shows up as heat in one way or another. The friction, of course, develops heat and heat also results from the compression of the gas. This heat may be partially dissipated in the compressor by passing air over fins on the cylinder, or by a water jacket.

The balance of the heat is given up as heat in the condenser, so that to determine how much energy is required to compress a pound of refrigerant vapor from a low pressure condition to a high pressure condition, the solution can be arrived at by finding the difference between the heat content of the gas leaving the compressor and the gas entering the compressor, and by finding the amount of heat given up by the gas during compression.

For an example, let's see how much heat energy is required to compress one pound of Freon—12 from a suction pressure of 30 p.s.i.a. (pounds per square inch absolute) and 70°F. to a pressure of 140 p.s.i.a. and a temperature of 140°F. Referring to

F-12 superheat tables (*Refrigerating Data Book*) we find the properties of

F-12 listed for both gas conditions as in Table 1:

TABLE 1					
Cond. Pressure	Temp.	Volume (v)	Total heat	Entropy	
p.s.i.a.			or enthalpy (h)	(s)	
1 30	70°F.	1.512 cu. ft. lb.	87.95 B.t.u./lb.	0.18699	
2 140	140°F.	.332 cu. ft. lb.	94.96 B.t.u./lb.	0.17590	

From the above it will be noted that the increase in total heat or enthalpy is $94.96 - 87.95 = 7.01$ B.t.u./lb. The amount of heat given up by the gas

during compression and disposed of by passing air over the compressor or water jacketing may be found as in Table 2:

TABLE 2	
$H = (s_1 - s_2) \frac{(460 + t_1 + t_2)}{2}$	
Where s_1 = entropy before compression s_2 = entropy after compression	
$H = (.18699 - .17590) \frac{(460 + 70 + 140)}{2} = .01109 \times 565 = 6.25$ B.t.u./lb.	
t_1 = temperature before compression t_2 = temperature after compression	

The total energy used in compressing and delivering the pound of gas is then 7.01 plus $6.25 = 13.26$ B.t.u./lb. Heat, of course, has an equivalent in foot pounds of energy and 1 B.t.u. is the equivalent of 778 foot pounds, so to compress one pound of gas we have put into it $13.26 \times 778 = 10,310$ foot pounds.

Actually, a good compressor with V-belt drive may utilize 65% of the energy delivered at the motor pulley to compress the gas, and the balance is lost in friction. Since the energy actually going to compress the gas is 10,310 foot-pounds, the energy deliv-

ered at the motor pulley must have been $\frac{10,310}{.65} = 15,860$ foot-pounds.

Since a 1 h.p. motor delivers 33,000 foot-pounds per minute, it would be able to supply energy to compress $\frac{33,000}{15,860} = 2.08$ pounds of gas per minute. Or, to think of it another way, it would take $\frac{15,860}{33,000} = .48$ h.p. to compress one pound of F-12 per minute.

The horsepower could be determined by arriving at a formula as in Table 3:

TABLE 3	
$H.P. = (h_2 - h_1) + (s_1 - s_2) \frac{(460 + t_1 + t_2)}{2} \times \frac{778}{33,000 \times M.E.}$	
$= (h_2 - h_1) + (s_1 - s_2) \frac{(460 + t_1 + t_2)}{2} \times \frac{778}{42.42 \times M.E.}$	
Where	h_1 = enthalpy before compression h_2 = enthalpy after compression s_1 = entropy before compression s_2 = entropy after compression t_1 = temperature before compression t_2 = temperature after compression M.E. = mechanical efficiency of compressor and belt drive.

By applying the above formula to various gas conditions, the variations in energy requirements may be studied. For instance, suppose the compressor does not have a water jacket and gives up very little heat to surrounding air. In that case, the temperature of the gas would be higher, and $s_1 - s_2$ would become quite small. Incidentally, if s_2 was greater than s_1 , it would mean that heat from an external source had been added to

the gas during compression, which rarely happens.

To study the effect of very little compressor cooling, let's change our conditions as in Table 4 below.

Since our horsepower per pound of gas per minute has increased from .48 to .55, due to reduction of compressor cooling, the advantage of fins and rapid air flow over the compressor is apparent. Water jacketing, of course, is still better.

To study the effect of insulating the suction line, using a short suction line, or otherwise maintaining a lower gas inlet temperature, we can see the effect of reducing our inlet gas temperature to 50°F. and making all other conditions the same as in the original case. The gas inlet and outlet conditions from the tables are then as shown in Table 5 (page 41).

Thus, lowering the suction temperature from 70 to 50° made a saving of .01 h.p. (.48—.47) or about 2%. A further reduction in suction temperature to about 30° would net a greater saving, and be quite practical.

Suppose that due to an undersize evaporator or an improperly set expansion valve, the evaporation pressure was reduced to 20 p.s.i.a. with all other conditions as before, then Table 6 (page 41) applies.

This shows that it is a good idea to keep the evaporation temperature as high as possible, as the power consumption goes up as the evaporation temperature goes down.

Conversely, as the discharge pressure goes up the horsepower per pound of refrigerant per minute goes up.

The energy required to compress a pound of ammonia would be much different from that for F-12. For example, to compress one pound of ammonia from 30 p.s.i.a. and 70°F. to

Continued on page 38

TABLE 4					
	Pressure	Temp.	Vol. (v)	Enthalpy (h)	Entropy (s)
Before Comp.	30	70°F.	1.512	87.95	.18699
After Comp.	140	190°F.	.321	102.80	.18646
Then H.P. for 1 lb. F-12/min. =					
$(102.80 - 87.95) + (.18699 - .18646) \frac{(460 + 70 + 190)}{2}$					
$42.42 \times .65$					
$= \frac{14.85 + .00053 \times 590}{42.42 \times .65} = \frac{14.85 + .31}{42.42 \times .65}$					
$= \frac{15.16}{42.42} = .55$ H.P.					



WMC Director McNutt receives plaque recognizing his agency's cooperation with National Council's manpower and training program. From left: Harry Alter, W. R. Kromer, Mr. McNutt, John Tessari, WMC.

WHAT TO DO

For men under 30: Be sure that all are listed with nearest WPB office (certifying agency) for inclusion in local quota to be certified. File 42-A (Special Revised) for certification in asking deferments.

For men over 30: See that local board has up-to-date job data on men now deferred.

Appeals from reclassification should be made in this order: (1) To local board; (2) To State Director of Selective Service; (3) If these moves fail, send full facts on case to J. S. Bartlett, Selective Service representative, National Refrigeration Council, Pepco Bldg., Washington, D. C.



Below: Council members who carried industry's story to WMC. Back row: W. W. Farr, Geo. Roche, Emerson Brandt, Mr. Ward (OCR), Nathan Edelstein, Mr. Van Wyck (WMC), Theo. Reina. Front row: C. C. E. Harris, Mr. Alter, Mr. Kromer, Mr. Tessari. Missing: J. S. Bartlett.

How the New Draft Rules Affect You

THE manpower situation in the refrigeration service industry is evidently more critical now than in July, 1943, when the Office of Civilian Requirements obtained special consideration from Selective Service headquarters in the form of a telegram from General Hershey to local draft boards, advising them to give special consideration to refrigeration repair men.

Decision of Selective Service to start drafting men from 30 through 33 years of age will add to the difficulties of refrigeration firms who attempt to obtain continued deferments for refrigeration repair men and engineers. Men up to the age of 34 now have to meet more stringent requirements to be eligible for deferments.

New instructions dated March 1, 1945, issued by the Office of Manpower Requirements of WPB, give

war and war-supporting activities more weight than previously in determining who shall be deferred.

These instructions, titled "Advice to Employers Regarding Selective Service," should be obtainable through the WPB District Office nearest you. This will give you the complete procedure for requesting deferment of all your employees, regardless of their age groups.

New Rules Summarized

However, here is a summary of some of the important points of the bulletin:

Registrants under 30 years of age: Deferments of employees in this age bracket will be considered only if the employer (1) files a list of all present 2-A and 2-B deferments; (2) requests deferment for those employees on DSS Form 42-A Special-Revised; (3) the request is certified by the proper cer-

tifying agency—which in the case of refrigeration repair men will be WPB.

No man in this age group will be considered for certification unless he is "necessary to and regularly engaged in" an activity in war production or in support of the war effort, and is "irreplaceable and indispensable" thereto.

The list which the employer sends to the WPB District Office should be filled out in triplicate, and should list the following information: the registrant's name, date of birth, occupation, Selective Service order number, Local Board, and present Selective Service Classification.

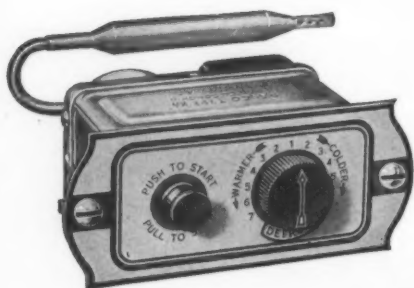
The list must be arranged in order of importance of each man to the employer, with the most important man listed first and the rest following in descending order of importance.

Continued on page 42

MICROSCOPIC INSPECTION...



...ANOTHER REASON WHY *Ranco* REFRIGERATION CONTROLS FUNCTION PERFECTLY ... ARE DEPENDABLE AND ACCURATE



MOST people associate the microscope with the microbe hunter in his search for microscopic organisms that can not be detected with the naked eye. Ranco uses a similar instrument in the manufacture of precision refrigeration controls. This enables Ranco inspectors to detect infinitesimal flaws in various parts that might, if not discovered and rejected, impair the proper functioning of the control. When such extreme care is exercised in the production of Ranco Controls, is it any wonder that they give better than satisfactory performance? That is why you can rely, when you use Ranco Controls, on their dependability and accuracy.

WORK WITH YOUR RANCO JOBBER

Ranco Inc.

COLUMBUS 1, OHIO

"Let's share our knowledge—exchange our experiences"

Here's how

Are You Interested in Sales?

Sure! We are all thinking about the day when refrigeration equipment will again be available. Some post-war planning is being done by every contractor.

Whatever these plans may be, let's not neglect the part of our business which carried us through this critical period: **SERVICE**.

We know now that service can be operated at a profit, and we also know that our customers are willing to pay a fair price for adequate service.

The days of the plier mechanic and the handyman are past. Skilled repairmen are now, as they will be in the future, the answer to the contractor's service problem. The trend is toward more completely automatic equipment. Adequate service training must be provided for men interested in this field of work. Let's use our service departments to build goodwill which, in turn, will mean increased sales. Let's be in position at all times to give the type of service the public has a right to expect.

Maintain a well-equipped service shop, operated by trained mechanics, and in the years to come it will pay dividends beyond all expectations.

Useful Shop Tool

"One of the most useful things in my shop," reports Gilbert C. Stearns of Stearns Refrigeration Service, Carbondale, Ill., "is an ordinary wood-faced bench vise such as woodworkers use.

"The wood facing enables me to hold parts that a regular vise would mar. Also, it serves as a jig for holding many jobs which would otherwise require a special jig—and it holds them at bench-top level.

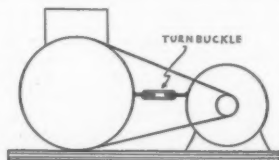
"I am passing this on to you in the hope that someone who hasn't tried

Edited by
Warren W. Farr

this idea will get as much help from it as I do."

Taking Up Belt Tension

To take up tension on belts sometimes is a somewhat annoying problem, but Emanuel Godin, Jersey City,



N. J., reports that he uses a turnbuckle to solve this task.

Mr. Godin places the turnbuckle between the motor and compressor, as shown. Then, by turning the turnbuckle, he obtains the belt tension required. This also gives him a chance to tighten the motor bolts, he says.

HELP YOURSELF!

Keeping refrigeration equipment in operation means, especially in these days, working out practical solutions to many routine servicing problems.

Exchanging our experiences with fellow engineers helps us all do a better job.

Send us that idea you're using—that simplified procedure, safety suggestion, new servicing tool, better way to do a job. Give us a brief description, and perhaps a rough sketch to help get the idea across. **THE REFRIGERATION INDUSTRY** pays \$5 for each idea published.

By moving the tool back and forth, you will find one spot where the motor will move back in perfect alignment when tension is applied.

If you don't already have one, this device will make a mighty handy addition to your tool box.

Replacing Power Elements

Here is a worthwhile servicing tip sent to us by John C. Gracy, owner of Gracy Electric Co., Olathe, Kans.

"The replacement of power elements on all thermostatic temperature controls," says Mr. Gracy, "can be performed very easily by wrapping a small piece of cloth around the control bulb and saturating the cloth with methyl chloride or Freon.

"This cloth will absorb enough refrigerant to hold a very low temperature for several minutes, giving plenty of time for the installation.

"This idea is not new, but it is very convenient and will really do the job."

A "Make It Yourself" Idea

To help the service man who needs frost-proof nuts for a particular job and has none with him, or is unable to get them from his regular source of supply, Milton E. Smoyer, Kansas City, Kan., contributes the following suggestion:

"If frost-proof nuts are not avail-



able, they can be made quickly from a conventional nut by simply sawing three cuts across the supporting shoulder of the nut.

"This leaves enough metal to support the tubing and permits slots for

THE SERVICE MAN'S DEPARTMENT

drainage of moisture."

As a supplement to Mr. Smoyer's suggestion, we might add that it is desirable to run a reamer through the nut after the slots have been cut to make certain that all burrs have been removed. The tubing will then readily pass through the opening.

"Tagging" Saves Time

Arthur Totten, of Standard Drug Co., Cleveland, sends in an idea that he says has saved many man-hours for his company at a time when service men are at a premium. His company, which operates a number of large soda fountains and luncheonettes with as many as six to eight condensing units in each store, now "tags" equipment lines as a time-saver.

In the past, it has been necessary for the service mechanic to trace out

WATER COOLER FOUNTAIN

his refrigerant lines each time he had a service call in any of the stores with which he was not thoroughly familiar.

In the course of its maintenance check-up during the winter months, the company has tagged each refrigerant

line, panel valve, and machine with a card as illustrated, showing the equipment which it serves. These cards are of good white card stock, with printing in red. It is the company's intention, Mr. Totten says, to replace these with metal tags whenever these are available.

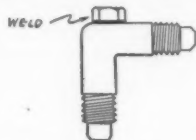
In addition to the card shown here, the company has printed cards designating equipment serving its salad units, reach-ins, back bar, ice cream storage, display cases, water and liquid coolers, soda fountain and other equipment.

"Rebuilt" Units Are Subject to Tax

Refrigeration firms which completely rebuild household refrigerators for immediate or eventual resale are subject to the manufacturers' excise tax, the Bureau of Internal Revenue has recently ruled.

The ruling (ST 927) also states that if the refrigerator is rebuilt for

AN elbow, being a necessary part of a service man's equipment, can be greatly improved by the addition of a hexagon wrench pad. In many cases where an elbow is used there is not enough space to allow a half turn with an open-end wrench, making it necessary to ap-



ply the wrench to the flare threaded end. The result is damaged threads and flare seat.

To overcome this I have added to several elbows (for servicing) a hexagon end opposite the pipe threaded end. To do this cut the head off a $\frac{5}{16}$ " SAE bolt or use a $\frac{1}{2}$ " hex nut, then weld or braze it on the elbow in line with the pipe threaded end. It will then be possible to use any $\frac{1}{2}$ " box or $\frac{1}{2}$ " ratchet wrench to tighten or remove the elbow, without any damage to flare seat or threads.

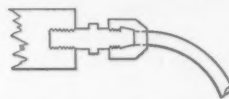
C. F. Holbein, Guelph, Ont., Canada

a person regularly engaged in the business of selling such articles, the seller becomes liable for the tax on his sale or exchange of the refrigerator. However, the tax is not intended to cover repair work, as distinguished from rebuilding.

Liability for tax, the ruling holds, is not incurred where articles subject to manufacturers' excise tax "are merely cleaned, painted, adjusted or

I do it this way...

YOU have all noticed fusible plugs installed as standard equipment in all high sides. This is as it should be, but the service contractor should not overlook the possible hazard connected with his working near them. We find it advisable to flare a short piece of tubing, using



proper size flare nut and fastened to fusible plug, turning the short piece of tubing toward the floor.

This will eliminate possible injury to the service man should the lead plug let loose and fly out. This is almost as bad as a bullet fired from a gun, as condensing pressure sometimes runs as high as 300 pounds where there is no high pressure cut-out installed.

We had the experience of a plug blowing out, at normal operating pressures, and inbedding itself in a board three feet away. This tube attachment will eliminate this hazard.

George J. Schuld, Cleveland, Ohio

repaired by replacing minor parts which are worn or broken," or "in connection with any work done for a customer which is in the nature of an immediate repair job."

The tax also does not apply in any case where an article is repaired or rebuilt under a contract for labor and materials.

It boils down to this: If you rebuild the units and resell them yourself, you are subject to the tax; if you rebuild them for resale by someone else, that person must pay the tax when he sells or trades them.

Service DO's and DON'T's

DO:

1. Clean condenser.
2. Check water flow.
3. Clean out water valve.

DON'T:

1. Heat drum with torch or flame; use warm water.
2. Set full drums in sun or near stoves or boilers.
3. Pull up too tight on tubing flares; you thin out the face and may cause a leak.

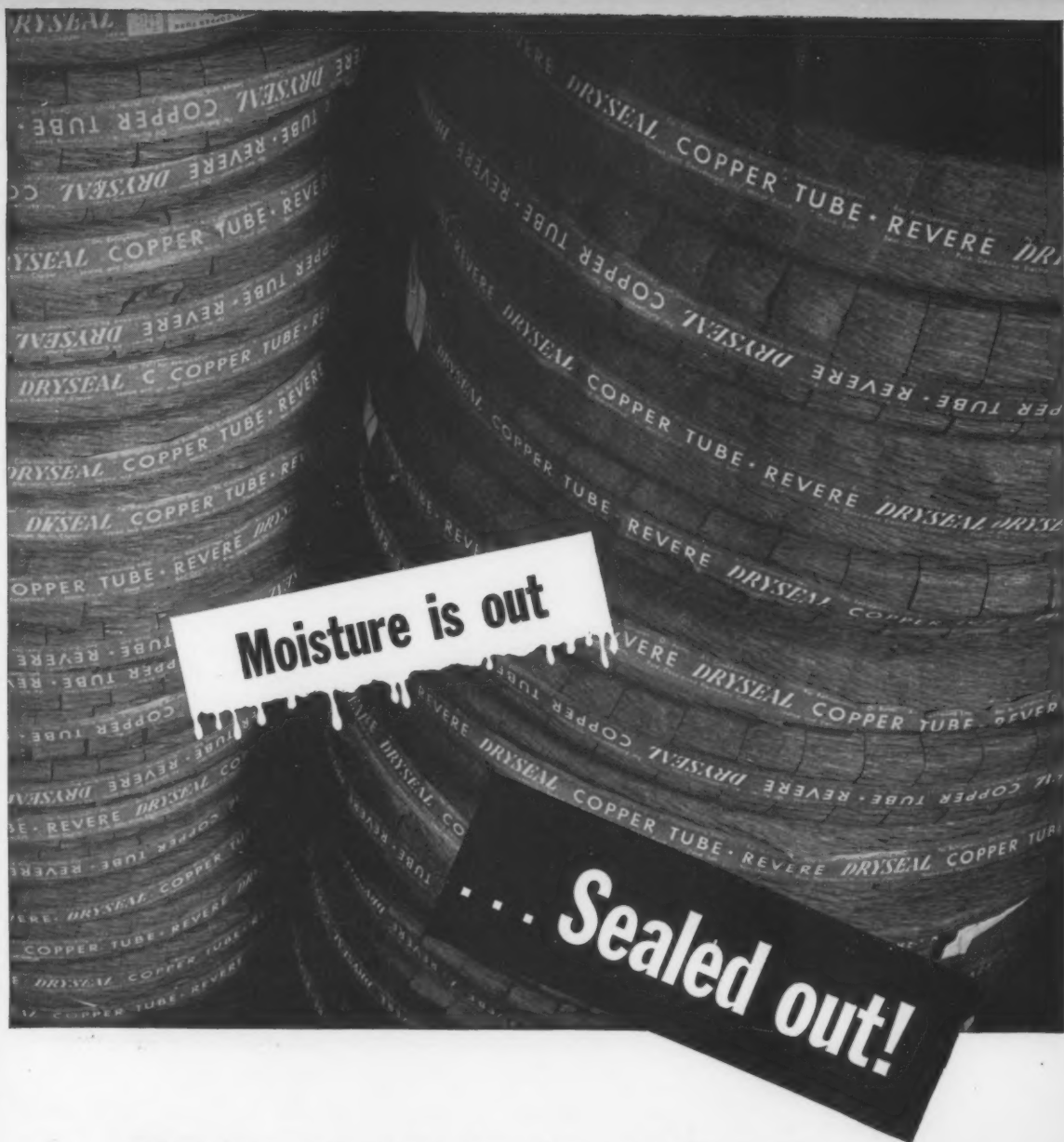
I do it this way...

Lighting a leak detector device having no pressure regulator is often difficult. The following method, and a little practice, will enable you to get the proper size flame in one try.

Crack the drum valve. Crack the needle valve. Hold your finger over the feeler hose. Light the gas, and, still holding your finger on the hose, adjust the needle valve until the yellow flame is about $1\frac{1}{2}$ inches long. Then slowly remove your finger from the hose. If the flame size is not correct, put your finger back on the hose and adjust the needle valve.

Sometimes when using a torch, even when the reactor plate is red hot, the hose will come in contact with a flat surface and the flame will go out. Should this happen, just hold the hose closed, as above, and it will re-light at once.

E. A. Wenk, New York City.



AVAILABLE now, Revere Dryseal Copper Tube, for refrigeration, air conditioning, heat control, bottled gas and many other uses, is sold by Revere distributors everywhere.

It comes in coils of 25, 50 and 100 feet, and each length is individually treated to remove all interior moisture, then sealed at both ends. You get it clean, bright and bone-dry, so that no moisture is present to react with any refrigerant and produce corrosive products.

This is but one of the "kid glove" treatments given Revere Dryseal Copper Tube so that it will be of utmost usefulness to you. It is made of deoxidized copper and is carefully kept free of oxides through every manufacturing step. In annealing this tube to dead softness, for example, the heating is done in a

controlled atmosphere.

It comes in sizes from $\frac{1}{8}$ " to $\frac{3}{4}$ " o. d. with .035" wall. Also available for refrigeration, air conditioning and a variety of other services is Revere Sealed End Copper Tube. Each end is plugged and taped for protection against injury and contamination. For Revere Dryseal or Sealed End Copper Tube, call your distributor. The Revere Technical Advisory Service is always available to help with your problems.

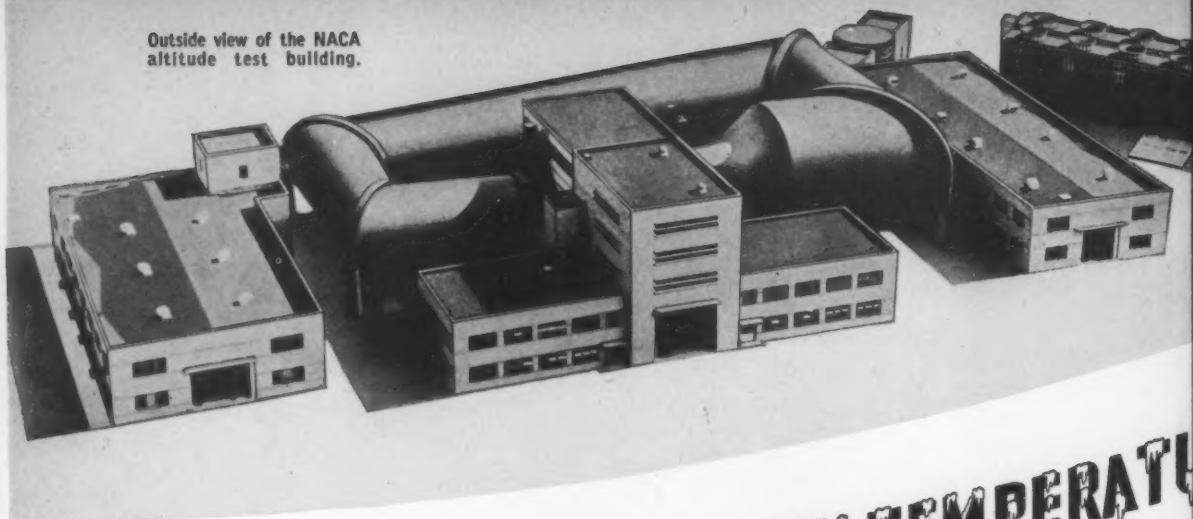
REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

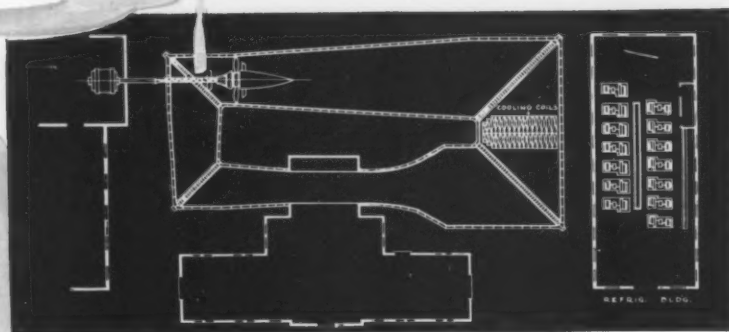
Executive Offices: 230 Park Ave., New York 17, N. Y.

Outside view of the NACA altitude test building.



The World's Largest LOW TEMPERATURE

Another chapter in the refrigeration helps to keep on top of anything our e



An "inside-out" view of the NACA altitude test tunnel.

Here are some quick facts on the NACA engine altitude test tunnel installation:

• Temperatures produced—minus 80°F to plus 59°F.

• Size of plant: 21,000 h.p. Instantaneous capacity: 7,500 tons of refrigeration.

• Refrigerant charge: 58,000 pounds of Freon-12. Refrigerant cooled in special flash cooler 55 feet long, 6 feet in diameter.

LOW temperature refrigeration equipment, already at work in many aspects of America's war production program, has taken on still another assignment in its task of helping our bombers and fighter planes out-climb, out-fight, and out-last anything that our enemies can put into the air against them.

What is said to be the world's largest low temperature refrigeration plant was recently put into operation at the Aircraft Research Engine Laboratory of the National Advisory Committee for Aeronautics in Cleveland, to serve the altitude test tunnel and the icing tunnel.

The research work undertaken by

the NACA Laboratory in Cleveland is recognized as constituting a major contribution to the advancement of the science of flying. Studies here are centralized on the special field of aircraft propulsion.

The refrigeration system, of 21,000 h.p. capacity, serves what is said to be America's largest aircraft engine altitude test tunnel. It will produce temperatures from approximately minus 80°F. to plus 59°F., depending upon requirements of the particular test. Temperatures for standard tests vary, in most instances, from 59°F. to minus 67°F.

With these "weather conditions" obtainable with the aid of refrigera-

ry of how
war planes
es send up



Shown here are the huge guide vanes for turning the high velocity air stream in the NACA tunnel.

tion, it is possible to test the performance and check operation of new types of aircraft propulsion units at conditions of temperature and density comparable to those existing at any altitude up to 50,000 feet. Wind velocities exceeding 500 miles per hour may be attained in the test section.

Main purpose of the refrigeration system is to extract the heat generated in the tunnel by the fan which circulates the air, and by the engines on test, and at the same time maintain a temperature which corresponds to the altitude at which the test is being conducted.

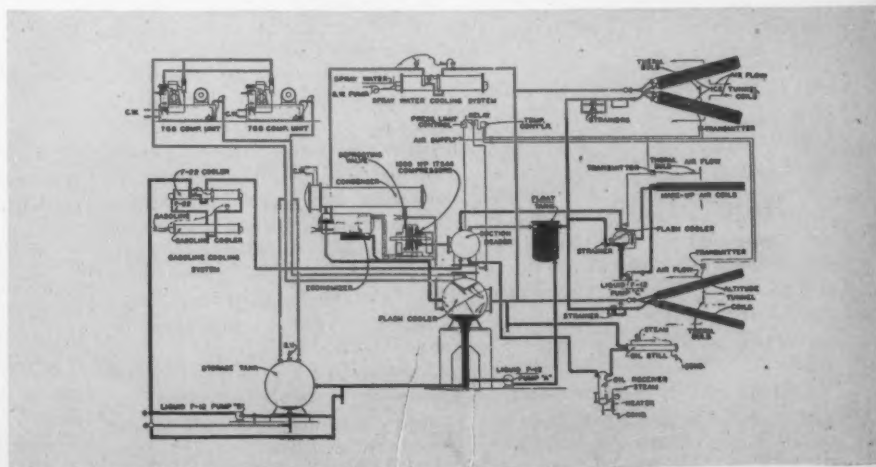
The installation consists of 14 Carrier centrifugal type, four-stage refrigerating compressors, which, when handling Freon-12, will develop a

head of approximately 20,000 feet (minus 67°F. to plus 86°F.). Instantaneous capacity, which is limited by the installed horsepower, is approximately 7,500 tons of refrigeration. Refrigerant charge—Freon-12—is approximately 58,000 pounds.

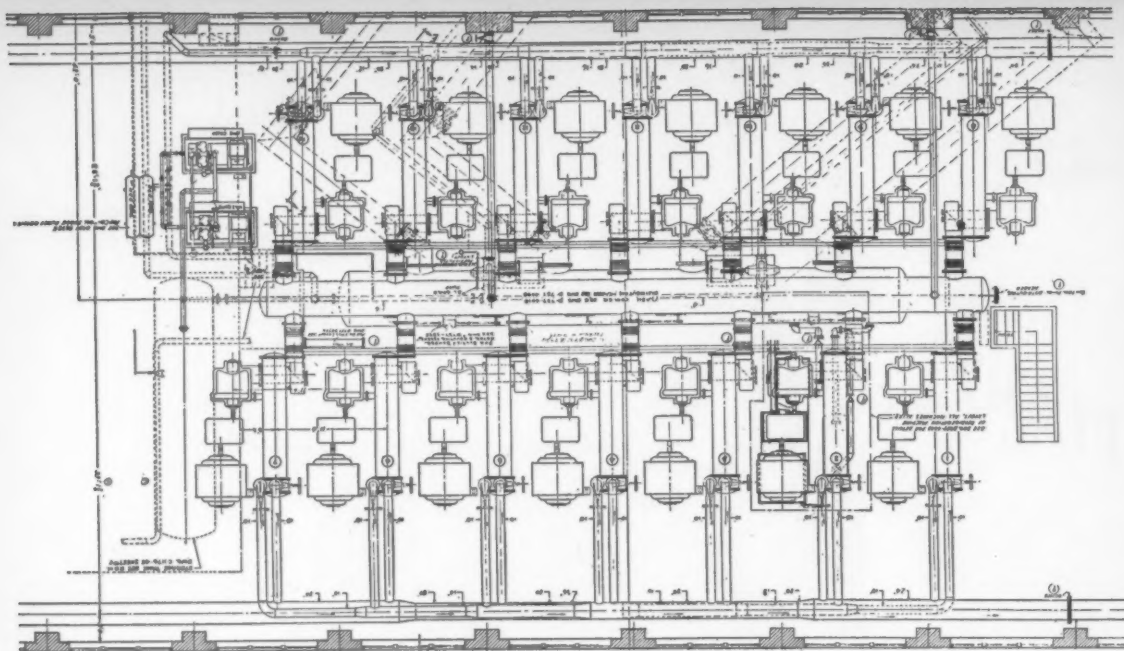
The refrigeration system may be described as a "flooded-flash" system, in which there is a positive supply of refrigerant to each coil of each of the large evaporators. The refrigerant is cooled in a special flash cooler 55



This 12-blade, 18,000 h.p. propeller fan circulates air at speeds up to 500 m.p.h.



Detail of refrigerant cooling and defrosting arrangement for NACA testing tunnel system.



21,000-h.p. refrigerating system serving America's aircraft engine altitude test tunnel. Shown in this sketch are the 14 centrifugal machines located in the refrigeration building, and the special flash cooler between them. This cooler is 55 feet long, six feet in diameter.

feet in length and approximately 6 feet in diameter, and the sub-cooled refrigerant is circulated by liquid pumps to the various evaporators serving each tunnel or test unit.

Under maximum load conditions, approximately 2,200 gallons per minute of Freon is handled by the two main pumps. This refrigerant is distributed to 260 coils of the plate fin type, which comprise the evaporator of the largest tunnel, by specially designed distributing valves which compensate for the static head even with variable flow and by orifices which compensate for pipe friction in the header.

Defrosting Cycle

Occasionally it becomes necessary to defrost certain of the evaporators after a lengthy test run. During the defrosting cycle the system operates on the same principle as a vacuum steam heating plant; the only difference being that the volatile liquid is Freon-12 instead of steam. The cycle is different from the conventional hot-gas defrosting and is an application which is unique in refrigeration practice.

This function is performed as follows: Circulating pumps are stopped, whereupon the float controlled throttling valves in the special float tanks

open to maintain a fixed suction on the evaporator. Half of the compressors may be operated with the condenser by-pass valves set to inject hot gas into the liquid refrigerant in the flash cooler, thus heating the refrigerant until the vapor pressure in the cooler reverses the flow and supplements the suction maintained in the evaporator. The heat of compression available for heating refrigerant, piping, evaporator and melting frost accumulation on the evaporator is approximately 10,000 h.p. or 2,100 tons.

An external two-stage economizer is provided for each compressor unit, which, when in use, will add approximately 56 per cent to the capacity of the machine when operating at the design condition of extreme head. It becomes necessary, however, under certain conditions of temperature in the cooler and suction pressure to the machine, to by-pass the economizer so that return of refrigerant from economizer to cooler is possible. This function is performed automatically by pressure switches on the cooler and header.

A receiver of approximately 5,500 gallons capacity is provided for storing the refrigerant during the period between tests, or for service on the main system. Auxiliary

equipment is provided to maintain suitable temperatures of the refrigerant when in the receiver or when held in the main system. The two reciprocating compressors which serve this function may be operated in parallel or staged, depending on the temperature level required. They may also be used for purging air from the system should leaks arise, or to precool gasoline when the main plant is not in operation.

Separate Recovery

Although each centrifugal compressor is equipped with its individual purge and recovery unit, it was felt desirable to supplement the standard units with larger displacement machines. This separate low temperature purge and recovery system will produce conditions which result in a very economical ratio of Freon-12 to air when purging.

The main refrigerating system may produce simultaneously the desired temperatures in the main evaporator, in an auxiliary evaporator, and in the gasoline cooler or the shell-and-tube type spray water cooler. Control of temperatures is obtained by a thermostat whose specially designed element is located in the path of the

Continued on page 37

HERE'S THE DATA YOU NEED

ON LUBRICATION

TECHNICAL BULLETIN
NUMBER 8-3
LUBRICATION OF
REFRIGERATION AND
AIR-CONDITIONING
EQUIPMENT

- TYPE OF REFRIGERATING EQUIPMENT
- FUNCTIONS OF ESSENTIAL COMPONENTS
- CHARACTERISTICS OF REFRIGERANTS
- EFFECT OF REFRIGERANTS ON OILS
- LUBRICATION RECOMMENDATIONS
- APPLICATIONS OF REFRIGERATION



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YOU CAN if the motors are G-E—and if you use our Factory Service Plans

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Investigate these simple, profit-making Factory Service Plans. Like hundreds of other dealers, you'll find they're a sure way of maintaining business now; a means of building and holding trade for the future. Ask your appliance manufacturer or distributor for details today. Or just fill in and mail the handy coupon. You'll be glad you did!



FRACTIONAL-HP
MOTORS

BUY WAR BONDS

GENERAL  ELECTRIC

HERE ARE THE PLANS

1. THE EXCHANGE PLAN

Covers the most commonly used types of G-E fractional-horsepower motors. Makes possible immediate replacement, from G-E field stocks or from your own buffer stock. Replacement motors carry the G-E new-motor warranty, except for finish.

2. SPECIAL REPAIR SERVICE PLAN

Provides for factory repair of semistandard G-E fractional-hp motors not covered by the EXCHANGE PLAN, at established prices. Enables you to make quick, accurate, on-the-spot estimates. Repaired motors carry the G-E new-motor warranty, except for finish.

3. REGULAR REPAIR PLAN

Covers fractional-hp motors not included in either of the other two plans, except extremely old or obsolete models. Inspection is made at the factory, and a cost estimate is submitted before work is started. These motors also carry the G-E new-motor warranty, except for finish. This plan rounds out this G-E service and enables you to handle repairs on practically any G-E fractional-horsepower motor.

General Electric Company, Section 700-78
Schenectady 5, New York

Please send me a copy of your booklet which describes the Factory Service Plans that will help me service G-E fractional-horsepower motors.

Name.....
Company.....
Address..... State.....
City.....

air leaving the evaporator, and which in turn pilots a receiver or pressure controller located in the master control room.

This pressure controller, which is responsive to output air pressure from the thermostat or transmitter, operates suction dampers to maintain desired evaporator temperature. A supplementary control of the suction damper is provided, which reacts to compressor suction pressure. This pressure limit device is used merely to prevent overload of the compressor motor. Should suction pressure to the machines rise above a predetermined point, this instrument will automatically supersede the temperature controller and position the suction damper to maintain the maximum suction pressure.

The main evaporator, as previously stated, consists of 260 plate fin-type coils. The coils have a total outside surface of 535,000 sq. ft. and a total face area of approximately 7,700 sq. ft. Under maximum conditions, 10,500,000 cu. ft. per minute of air flows through these coils.

Due to the limited space available for installing the surface required for the maximum load, the individual coils of the evaporator are arranged in a zig-zag pattern. This arrangement and optimum angle of approach were determined only after a careful study was made of the effects and the resultant losses when the air stream approach angle and the plate velocity were varied through a wide range.

The result of this analysis indicates that the optimum angle of approach is approximately 12°, and at this angle the total of the dry plate friction and the approach, exit and tail piece losses is approximately 1.44 in. H₂O for the specific condition.

Actual approach angle for this particular heat exchanger is 11°, thus permitting the installation of the required surface for the design load.

The two liquid lines serving the largest evaporators are 8 inches in diameter and are made of copper-nickel steel. The suction line from one evaporator consists of four copper-nickel steel pipes 32 inches

in diameter. Temperature differences in the piping make it essential to install some type of flexible connection which will permit movement during extreme conditions of temperature.

Special copper corrugated joints, equipped with tie-rods to take the thrust due to internal pressure under certain conditions, are used in sets of five to permit movement in both the horizontal and vertical planes. These joints will take only angular motion; hence the need for three in one

plane, which produces the necessary "elbow action" while two others will permit the necessary movement in the vertical plane. Double "U" type bends in the liquid line suffice to take the movement in these 8-inch pipes.

A small rectifying unit or oil still is provided in case undue loss of oil results from the reciprocating units, the refrigerant pumps, or the centrifugal compressors. Operation of the oil still is automatic, except for

Continued on page 64



REFRIGERATED SHIPS AND DEHYDRATED FOOD
SAVED ENOUGH CARGO SPACE TO FRUSTRATE HITLER'S
1941 SUB CAMPAIGN. THOUGH SOME WERE SUNK, THOSE
REACHING ENGLAND CARRIED TRIPLE PRE-REFRIGERATION CARGOES.

TWO IMPORTANT CONTRIBUTIONS TO REFRIGERATION AND FOOD PRESERVATION DEVELOPED BETWEEN WORLD WAR I AND WORLD WAR II ARE... ANSUL LIQUID SULFUR DIOXIDE,— ANSUL LIQUID METHYL CHLORIDE... IMMEDIATELY AVAILABLE

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"Now in our 30th year"

AGENTS FOR KINETIC'S "FREON-11," "FREON-12" AND "FREON-22"

140 p.s.i.a. and 140°F., the problem works out as in Table 7.

The fact that it takes 3.53 h.p. for one pound of ammonia per minute, as compared to .48 h.p. for F-12 for the same pressure and temperature conditions, has no bearing on the relative performance of the two refrigerants, as one pound of ammonia will pick up several times as much heat as will one pound of F-12.

Consequently, to put down in formula form a means of making a comparison, we must take into account the number of pounds of refrigerant to be circulated for a definite amount of heat removal. Also, for comparison the evaporation and condensing temperature should be the same, and probably the compressor cooling in B.t.u./minute should be comparable.

To arrive at a formula to determine the horsepower required for one ton of refrigeration or 200 B.t.u./min., we can work out a formula as follows:

Let h_1 = enthalpy before compression (superheat tables)

h_2 = enthalpy after compression (superheat tables)

h_3 = enthalpy of saturated gas (superheat table at suct. pt.)

h_4 = enthalpy of liquid to expansion valve

s_1 = entropy before compression

s_2 = entropy after compression

t_1 = temperature before compression

t_2 = temperature after compression

The number of pounds of refrigerant to be circulated per minute for one ton of refrigeration is

$$\text{lb./min.} = \frac{200}{h_3 - h_4}$$

and the horsepower

$$\frac{\text{H.P.}}{\text{Ton}} = \left(\frac{200}{h_3 - h_4} \right)$$

$$\left(\frac{(h_2 - h_1) + (s_1 - s_2) (460 + \frac{t_1 + t_2}{2})}{42.42 \times \text{M.E.}} \right)$$

To compare ammonia and F-12 on an approximately equal basis, the data in Table 8 has been selected from the refrigerant tables.

This comparison shows that from a purely thermodynamic point of view, ammonia would be preferable to F-12; however, from the practical

standpoint F-12 has many advantages also. In a similar way, any refrigerants on which tables are available may be compared or horsepower calculations made.

Now, if Little Elmer can hold his

breath or curiosity in check after digesting the above, we will try to explain to him in a later issue where that 35% (or thereabouts) of his motor energy goes, which leaves him a mere 65% mechanical efficiency.

TABLE 5

	Pressure	Temp.	Vol. (v)	Enthalpy (h)	Entropy (s)
Before Comp.	30	50	1.448	85.03	.18138
After Comp.	140	140	.332	94.96	.17590

H.P./lb./Min. =

$$(94.96 - 85.03) + (.18138 - .17590) (460 + \frac{50 + 140}{2})$$

$$42.42 \times .65 \text{ M.E.}$$

$$\text{H.P.} = \frac{9.93 + (.00548 \times 555)}{42.42 \times .65} = \frac{9.93 + 3.04}{42.42 \times .65} = \frac{12.97}{42.42 \times .65} = .47$$

TABLE 6

	Pressure	Temp.	(v)	(h)	(s)
Before Comp.	20	70	2.297	88.31	0.19415
After Comp.	140	140	.332	94.96	0.17590

H.P./lb./Min. =

$$(94.96 - 88.31) + (.19415 - .17590) (460 + \frac{70 + 140}{2})$$

$$42.42 \times .65 \text{ (M.E.)}$$

$$= \frac{6.65 + (.01825 \times 565)}{42.42 \times .65} = \frac{6.65 + 10.30}{42.42 \times .65} = .615$$

TABLE 7

	Pressure	Temp.	(v)	(h)	(s)
Before Comp.	30	70	10.88	650.9	1.4161
After Comp.	140	140	2.515	673.7	1.2843

H.P./lb./Min. =

$$(673.7 - 650.9) + (1.4161 - 1.2843) (460 + \frac{70 + 140}{2})$$

$$42.42 \times \text{M.E.}$$

$$= \frac{22.8 + (.1318 \times 565)}{42.42 \times .65} = \frac{22.8 + 74.5}{42.42 \times .65} = \frac{97.3}{42.42 \times .65} = 3.53 \text{ H.P.}$$

TABLE 8

	F-12	Ammonia
Evaporation temp.	11.1	11.66°F.
Evaporation press.	30 p.s.i.a.	40 p.s.i.a.
Condensing temp.	93.4	93.13°F.
Condensing press.	120 p.s.i.a.	190 p.s.i.a.
Liquid to exp. valve	80°F.	80°F.
h_1	85.03	637.8
h_2	95.65	666.5
h_3	79.47	615.4
h_4	26.28	132.0
s_1	.18138	1.3583
s_2	.17932	1.2396
t_1	50°F.	50°F.
t_2	140°F.	140°F.

H.P./ton for F-12

$$= \frac{200}{79.47 - 26.28} \left(\frac{95.65 - 85.03 + (.18138 - .17932) (460 + \frac{50 + 140}{2})}{42.42 \times \text{M.E.}} \right)$$

$$= \frac{200}{53.19} \times \left(\frac{10.62 + 1.143}{42.42 \times .65} \right) = \frac{200 \times 11.763}{53.19 \times 42.42 \times .65} = 1.605 \text{ H.P.}$$

H.P./ton for Ammonia

$$= \frac{200}{615.4 - 132.0} \left(\frac{666.5 - 637.8 + (1.3583 - 1.2396) (460 + \frac{50 + 140}{2})}{42.42 \times \text{M.E.}} \right)$$

$$= \frac{200}{483.4} \times \left(\frac{28.7 + 65.8}{42.42 \times .65} \right) = \frac{200 \times 94.5}{483.4 \times 42.42 \times .65} = 1.42 \text{ H.P.}$$

SNAP...IT'S OPEN

NO "STICKAGE"

SNAP...IT'S CLOSED

Henry Diaphragm Relief Valve

For Instantaneous Pressure Relief with Fast and Positive Reseating

Design of this relief valve is unique in that it incorporates a diaphragm construction with an unusual seating arrangement. The result is an opening and closing snap-action movement. Large surface area of the pressure actuated diaphragm causes instantaneous relief as compared to gradual opening in conventional spring loaded relief valves. When the pressure in a system reaches the relief point, wire drawing, which may ruin a valve seat, can not take place because there is no slow movement of the valve seat disc in the Henry Diaphragm Relief Valve.

This valve is recommended for protection to a system containing a large charge of freon or methyl chloride refrigerant. It may be employed either for relieving high side or low side to atmosphere. It can also be installed so as to relieve from high to low side of system. It meets the requirements of all existing safety codes. Due to its acknowledged efficiency through dependable performance under all conditions of service, the Henry Diaphragm Relief Valve is today widely used in refrigeration and air conditioning installations of the Army, Navy and Maritime Commission.

The Henry Diaphragm Relief Valve is available in 1/2" F.P.T., 3/4" F.P.T., 1/2" O.D. and 3/8" O.D. Solder connections and at pressures ranging from 90 pounds to 300 pounds per square inch. Each valve is individually adjusted, set at pressures ordered and marked with its rated free air passage capacity per minute. Locking device prevents tampering with pressure setting or changes in setting due to vibration.



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Type 542. With solder connections. Extended tube sockets at inlet and outlet ports prevent transfer of installation heat to internal parts.



Type 541. With female pipe thread connections.



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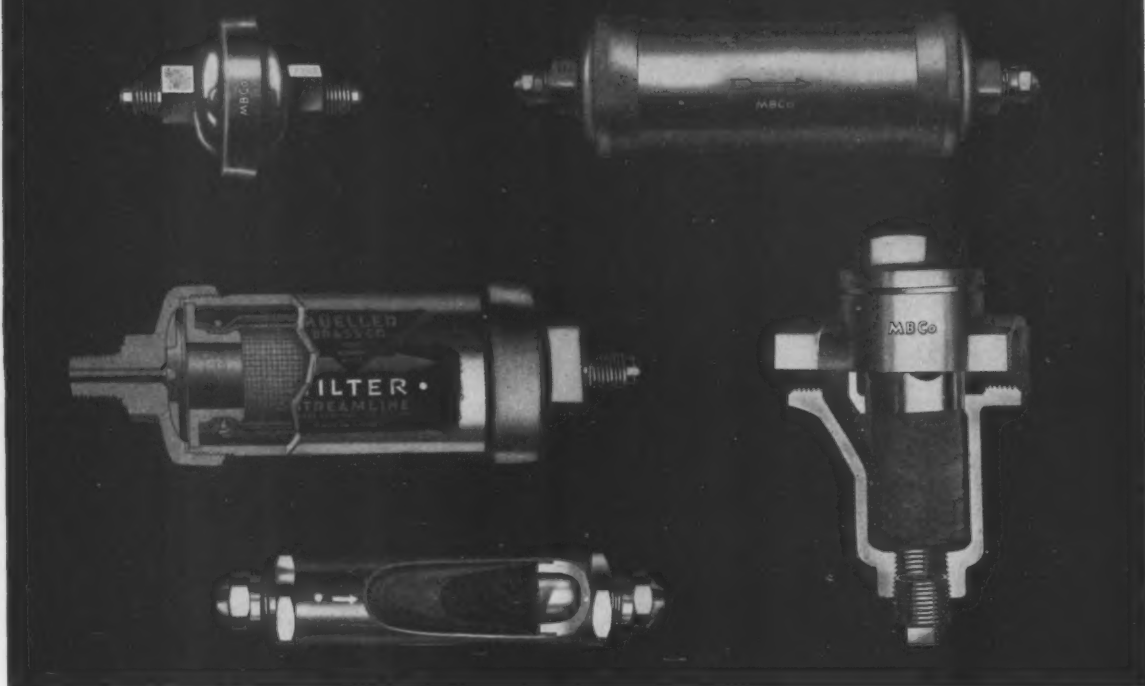
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All Filters and Strainers are designed to insure efficient passage for the maximum refrigerant volume that is generally used in any particular size refrigerant line. The range is exceptionally complete — one for every specific purpose.

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Jack Langston Mfg. Co., Dallas; E. S. Matthews, Inc., Spokane; Morton Show Case, Inc., Washington C.H., Ohio; McCray Refrigerator Co., Kendallville, Ind.; C. L. Percival Co., Boone, Iowa; Refrigeration Engineering Co., Seattle; Royal Store Fixture Co., Philadelphia; C. Schmidt Co., Cincinnati; Southern Fixture Mfg. Co., Greensboro, N. C.; Tyler Fixture Corp., Niles, Mich.; Wells Birkenwald Co., Seattle, Wash.; Winorke Mfg. Co., Tacoma, Wash.; Zero Plate Co., Dallas.

● BRIEFLY TOLD

COST OF OPERATING a "heat pump" air conditioning system (reverse cycle refrigeration unit) compares favorably with conventional methods of home heating, G. K. Marshall, G-E air conditioning engineer, declared

in a recent talk before a sectional meeting of American Institute of Electrical Engineers . . . "Using power at 1 cent per kwh., the heat pump would have the same operating cost as coal at \$14 a ton, oil at 10 cents a gallon, manufactured gas at 40 cents per 1,000 cu. ft. or natural gas at 80 cents per 1,000 cu. ft.," he said. . . . Further development of equipment, he said, will reduce these costs much.

A considerable amount of the funds now being set aside by America's churches for postwar building and improvements will go for air conditioning, the Wall Street Journal finds after a recent survey. . . . One church, in Washington, D. C., already has \$50,000 set aside for that purpose.

A recent survey by the magazine *Men's Wear* reveals that one-half of the 57 per cent of merchants covered who did not have air conditioning intend to add this equipment post-war, and that 18 per cent of those who now have cooling systems plan to enlarge them as soon as materials can be had.

● THE CHEMICAL FRONT

At last reports, action on many individual appeals for allotments of Freon-12, which normally would rate favorable consideration, were being delayed because of the inability to obtain extra quantities for such purposes before the end of the first quarter of the year. This means that some firms with appeals pending may not hear anything about them until sometime after the first of April. After that time it is predicted that extra allotments will be made for civilian use.

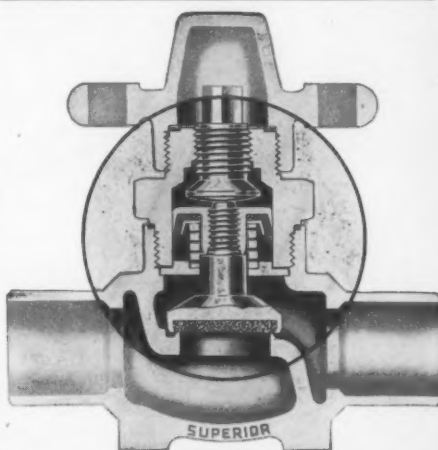
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No. 95

PRESSURE CUP VALVES

The skirt of the pressure responsive cup—acting like the piston in an automobile tire pump—automatically forms a positive pressure seal, with the valve stem in *any* position. Eliminates packing "drag" and leaks prevalent with conventional packed valves.



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 4. Wrench flats for easy removal of internal assembly
 5. Spring assures positive opening under pressure
 6. Generous openings assure against pressure drop
- Available in sizes through 2½" sweat and 2" F.P.T.
If you haven't a copy of Catalog R2, request one today.

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PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES • WEST COAST STOCK LOS ANGELES (15) • JOBBERS EVERYWHERE

MANPOWER...

Continued from page 27

Also, the employer must sign the following certification:

"It is certified that all men listed above are now in my employ; were classified 2-A or 2-B on Jan. 1, 1945; and were on that date in the age group 18 through 29; that such list has been submitted to no other Certifying Agency."

The WPB District Manager will certify the forms in accordance with definite criteria. District officers have authority to certify only a small per-

centage of total names submitted. Certified 42-A forms are sent directly by the WPB office to the local draft board; those not certified are returned to the employer, who then may send them directly to the local board with request for deferment.

Who's Deferred

Deferment requests, in either event, however, will be considered only if it is determined that the registrant is "necessary to and regularly engaged in" and is "indispensable and irreplaceable" in a job included in the WMC list of essential activities.

Registrants 30 through 33 years old: Under the revised regulations, men in this age group must be "necessary" to the operation of the activity in which they are engaged.

It is advisable for employees to check all 2-A deferments and file a new 42-A for each man with his local board, bringing up to date the information about his work and the reasons he is critical to his particular job. Local boards are now authorized to reconsider all men in this age bracket if the supply of 1-A registrants is insufficient to meet quotas.

A "necessary man," according to Selective Service, is one who cannot be replaced because of a shortage of persons with his qualifications or skill, and whose removal would cause a serious loss of effectiveness in his field of activity. Duties of the job, therefore, should be given in detail.

At present, *men 34 through 37* need only be engaged in activity designated as being in support of the war effort, regardless of the work and their length of employment at it, to be defermentable. It is recommended, however, that 42-A forms be filed for all men in this age group for whom a continued deferment is desired, to bring the information up to date. Physically disqualified men in this bracket also should be covered.

When an employer wishes to have the reclassification of a registrant reconsidered by the local draft board, he should, within 10 days of the date of mailing of the classification notice, write to the local board and request reconsideration of the classification. *It is important that he state definitely that if the board does not reclassify the registrant, then he, the employer, requests that the registrant's file be referred to the Appeals Board for review.*

Complete Information

Under the heading, "Local Board Procedure," the Advice to Employers emphasizes the importance of submitting complete information which will establish the essentiality of an activity, as well as giving a clear description of the registrant's occupation and duties within the activity. Detailed information should be given in all instances, so that all possible data will be at the local board's hand when the case is considered.

Special emphasis should be placed on the difficulty of securing replace-



Will it have a handsome modern Dial Thermometer?

● If you are planning refrigeration equipment, particularly the "cold box" type, the Marsh organization is in an excellent position to produce dial thermometers that will grace your equipment—thermometers as accurate as they are attractive. Yet, thanks to modern production methods, we can supply them in quantities at a cost that you can justify in a highly competitive market.

If your present plans do not call for a thermometer, consider this sales building feature in the light of competition that is bound to come. An attractive dial thermometer is the costume jewelry of the refrigerating unit—and proof that the unit is doing its job right.

The thermometer illustrated is the Bi-metallic type, but special types and dials are available in quantity orders. No matter how unusual your design, Marsh engineers are ready to help you incorporate a thermometer that will add another effective talking point to your cold box. Write for further information today.

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MARSH

Refrigeration
Instruments

ments qualified to handle the job, and any training program, either in or outside the shop, should be covered fully.

The National Refrigeration Service Council has taken several steps in the past few weeks to advise government agencies that a serious manpower situation does exist, since local draft boards in many instances are reclassifying experienced men of all ages, and are forcing experienced refrigeration men into defense plants and other activities considered more essential to the war effort.

On Feb. 13, the National Service Council's manpower committee met in Chicago to review manpower information received from local councils. This information showed that in the majority of cases local service contractors will not be able to maintain existing refrigeration equipment with their present staffs this coming summer, since, with few exceptions, long hours were necessary to keep up with the task during the winter, normally an "off" period for refrigeration maintenance work.

At a meeting Feb. 19 with the subcommittee of the Committee on Es-

sential Activities of the War Manpower Commission, Council representatives submitted results of their nation-wide survey, which showed:

That there is not a sufficient number of remaining competent experienced service men to properly maintain the nation's refrigerating machinery.

That local draft boards are continuing to take remaining experienced men, regardless of age, from many communities and are forcing experienced men over 30 to leave the industry.

That immediate advice to local draft boards would be necessary to forestall a breakdown of contractors' organizations in many communities, thus turning what had been considered a successful training program into failure.

That less than 10 per cent of remaining experienced men are under 30 years of age, and that the national total of experienced service men of all ages is less than 6,000.

That proper maintenance of the nation's refrigeration equipment

We can deliver MOTOR-STARTING CAPACITORS

Exact duplicate motor-starting capacitors? Sure — Sprague offers the finest, most complete line — BUT: Why not follow the lead of prominent motor manufacturers and standardize on the small Sprague 3500 Series UNIVERSAL Types? They meet ANY requirement up to their rated capacities. They fit anywhere. They're more dependable than the big, old-style units they replace. They're available for PROMPT SHIPMENT in capacities from 24 mfd. to 350 mfd., 110 Volts A. C.!



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directly affects the progress of war material production through direct application, and indirectly through proper preservation and conservation of food for the armed forces and civilian population.

Reports to national headquarters of the Refrigeration Service Council show that in only three of some 38 communities where local Councils are active is there any expectation that the supply of trained manpower will be equal to next summer's servicing job.

Councils reporting that under pres-

ent conditions their supply of trained men will be insufficient to handle servicing requirements include those in such cities as Washington, D. C., Los Angeles, Calif., Detroit, Mich., Cincinnati, Dayton, and Cleveland, Ohio; Philadelphia, Pa., Baltimore, Md., New York City, Dallas and Houston, Tex., St. Louis, Mo., Memphis, Tenn., New Orleans and Baton Rouge, La., Newark, N. J., St. Paul, Minn., and Kansas City, Mo.

In a letter placing these and other facts before officials of the Office of Civilian Requirements, War Produc-

tion Board, which under the present arrangement acts as a certifying agency for refrigeration repair men, W. R. Kromer, National Service Council director, points out that while the industry has carried on without complaint despite long hours, partly trained helpers, and lack of tools and parts, it cannot do the impossible and maintain refrigerating equipment without manpower.

"The National Refrigeration Service Council, speaking for the service industry, must rest the responsibility for any serious consequences arising from this manpower problem with the government agencies vested with the power and responsibility to correct situations that may impair the war effort and/or the health and welfare of the nation," the letter states.

The National Council will cooperate, and can assure the cooperation of local councils, should Selective Service see fit to instruct local draft boards as was done in 1943, Mr. Kromer declares.

BOSTON DISTRIBUTOR OPENS NEW SERVICE DEPARTMENT

A. E. Balfour Co., distributor of Bastian-Blessing soda fountain equipment, has opened a new service department in connection with its showrooms and offices at 88 Brookline Ave., Boston.

LANGSENKAMP OPENS LOUISVILLE BRANCH

Formal opening of its new branch at 4th & Main Sts., Louisville, Ky., was observed by F. H. Langsenkamp Co., parts and supplies jobber with headquarters in Indianapolis, with an "open house" on March 16.

Complete stocks of equipment, including compressors, coils, controls, valves, hardware, gases, etc. will be carried by the new branch, which will be managed by J. M. Berry, formerly with Prest-O-Lite Co.

The branch occupies the first and second floors of a building 19 x 100 ft. long with loading facilities and freight elevator service, total footage being about 5,000 sq. ft. When fully stocked, the new location will carry all the lines now handled by Langsenkamp at its Indianapolis and South Bend locations.



**Why oil-free coils mean
greater efficiency in your
refrigeration system**

When you apply a TEMPRITE "Oilrite" Automatic Oil Separator to any refrigeration system, you can expect these results:

- The refrigerant will remain at its true boiling point when undiluted by oil.
- Speed of heat transfer frequently increased up to 20%.
- Crank case oil level is constant... no scored parts.
- Oilrite Separator positively removes dirt and scale.
- Expansion valve operates more efficiently.

➤ Low temperature installations easily reach from four to seven degrees lower without increased operating time.

Note: Complete line of Adapter Block Assemblies available to facilitate installation of Separators.



**CAPACITIES:
one-sixth h.p. to
sixty tons**

Write today
for
descriptive
bulletins
and prices.

TEMPRITE PRODUCTS CORP.

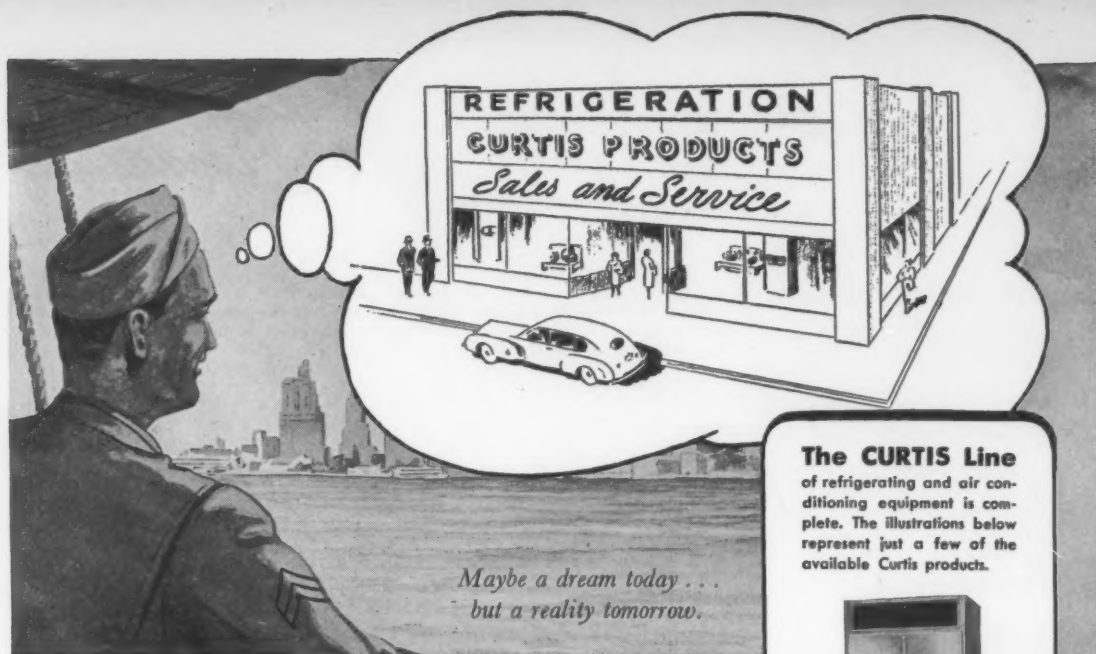
Originators of Instantaneous



Liquid Cooling Devices

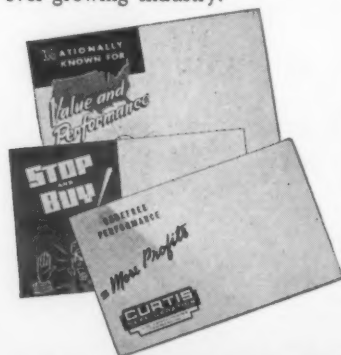
41 PIQUETTE AVENUE

DETROIT, MICHIGAN



CURTIS Refrigeration Equipment Offers You the Same Economical Dependability So Valuable to Our Armed Forces

To thousands of our G. I. Joes and men in all branches of the service who have seen CURTIS equipment "deliver the goods"—to those who are thinking of that "after-the-war-job," or "that business of my own," no wiser steps can be taken than to put to good use the experience gained in the installation and maintenance of refrigeration and air conditioning equipment—by becoming actively engaged in the further development of this ever-growing industry.



Write for Complete Information

You will be interested in reading about the possibilities in the field of refrigeration and air conditioning. Why not write today for Bulletins C-58, C-68-C, and C-14-M, covering this interesting and profit-building business.

CURTIS REFRIGERATING MACHINE DIVISION

of Curtis Manufacturing Company

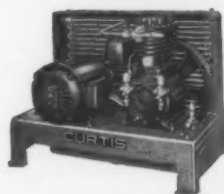
1915 Kienlen Avenue, St. Louis 20, Missouri

The CURTIS Line

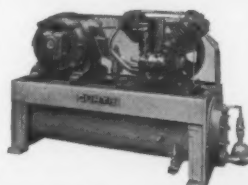
of refrigerating and air conditioning equipment is complete. The illustrations below represent just a few of the available Curtis products.



5-HP. Curtis Packaged Air Conditioner



1½-HP. Curtis Condensing Unit



15-HP. Water-cooled, Shell and Tube Condensing Unit

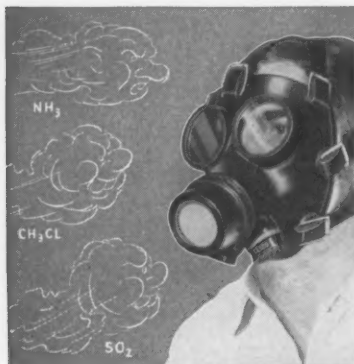


437

FOR VICTORY BUY MORE U. S. WAR BONDS AND STAMPS

3-way Protection

...at lower cost



with **CESCO'S**
No. 605 FUME KIT



CESCO'S Healthguard Fume Kit (No. 605) offers triple protection to refrigeration servicemen. Quick-change filter cartridges provide safety against ammonia, methylchloride and sulphur-dioxide fumes... all in one convenient kit. The soft molded rubber face-piece of the fume mask, and the instantly adjustable headgear assure a gastight, comfortable fit for every wearer. Large hardened safety glass lenses give perfect visibility.

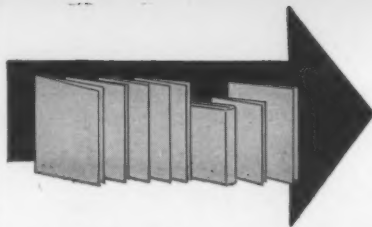
The CESCO Healthguard Kit provides economical protection because it is moderately priced.

For full information, write for CESCO'S No. 605 Bulletin TODAY.



CHICAGO
EYE SHIELD CO.
2340 Warren Boulevard
Chicago 12, Illinois

CESCO
FOR SAFETY



Useful Literature

The publications featured on this page were written by experts. They are FREE publications. To obtain these write to THE REFRIGERATION INDUSTRY, 812 Huron Road, Cleveland, 15, Ohio. If there is some delay in receiving the material requested, please understand that this is due to our operating with a minimum staff. We shall put through all requests as rapidly as possible.

136—Seals . . . Price list and general information on the line of replacement seals it has available for various types of refrigeration compressors. Offered by Chicago Seal Co.

137—Hose Fittings . . . Bulletin No. 103, describing and listing special features of its detachable, re-usable hose fittings now available for use with low pressure hose. Fittings are applicable to refrigeration service charging lines. Issued by Aeroquip Corp.

138—Vibration Measuring Equipment . . . An 8-page booklet (GEA 4140) describing three recently developed vibration-measuring instruments which may be used on various types of mechanical equipment, motors, compressors, etc. Lists specifications, features and accessories. Offered by General Electric Co.

139—Insulation . . . Factual data on the insulating efficiency and application advantages of Fiberglas A E Board insulation in low temperature uses. Issued by Owens-Corning Fiberglas Corp.

140—Thermometers . . . A catalog issued by Gotham Instrument Co. (No. 45) designed to facilitate selection of thermometers, recorders and controllers for particular needs, and giving descriptions and specifications.

141—Micrometer Care . . . A booklet, issue by Save-Way Industries, Detroit, describing the functions and care of micrometers, stressing importance of frequent checking to insure accurate readings. Of

interest to mechanics, engineers, and others doing precision work.

142—Walk-in Freezer . . . a folder issued by Beall Pipe and Tank Corp., Portland, Ore., describing features of its new "walk-in" freezing unit for use in homes, stores, restaurants. Also lists some data on its reach-in and upright models. All units are for post-war delivery.

143—Low-Volt Tester . . . A one-page sheet available from Ideal Commutator Dresser Co., Sycamore, Ill., describing and illustrating its recently developed "lo-volt test-glo" tester for low-voltage circuits. If interest to mechanics and electrical men.

144—Control Booklet . . . A new 20-page booklet by Westinghouse Electric & Mfg. Co. describing seven types of bimetal thermostats to fill a range of applications up to 650° F. Characteristics and capacities of each type discussed and tabulated for easy selection; operation and mounting illustrated.

145—Fluxes . . . A pamphlet issued by Krembs and Co., Chicago, showing application of "Fluxine" fluxes to stainless steel, stainless iron, and nickel and chrome alloys. Data, applicable to refrigeration field, was prepared by a group of consulting welding engineers.

146—Water Cooling . . . Two booklets issued by Sunroc Refrigeration Co., Glen Riddle, Pa., telling the story of the company's development and describing and illustrating basic models of water coolers now available for essential uses.

MAIL THIS COUPON FOR FREE LITERATURE

Refrigeration Industry, 812 Huron Road, Cleveland 15, O.

I should like a copy of the literature listed below:

NO. _____	NO. _____	NO. _____	NO. _____
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4-45



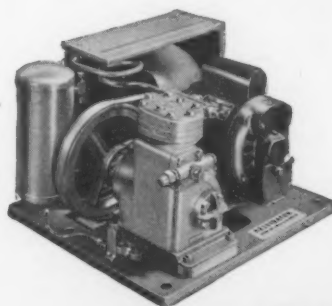
Customer: "What's going on here?"

Salesman: "Even the cheese has been contented since we installed our new Kelvinator Condensing Unit!"

More dependability... more economy... more performance! This has been the result of Kelvinator's 30 years of leadership in engineering, designing and manufacturing of condensing units.

That's the reason progressive service men always specify Kelvinator!

Kelvinator distributors and zone offices stock a complete line of refrigeration supplies.



Kelvinator
DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT
CONDENSING UNITS
SEALED • OPIED



FOR YOUR HOME—REMEMBER KELVINATOR REFRIGERATORS, ELECTRIC RANGES, WATER HEATERS AND HOME FREEZERS



J. W. Krall has been appointed executive vice president of the Tyler



Fixture Corp., Niles, Mich., and will also be elected to the organization's board of directors. He was scheduled to assume his new duties April 1.

Having acquired plants in Detroit and Cobleskill, N. Y., Tyler is planning considerable expansion of its business, and Mr. Krall will direct this expansion program, according to president Jerry Tyler.

Mr. Krall is widely known in the refrigeration industry through his connection with Detroit Lubricator Co., where he has served in recent years as manager of the refrigeration department.

Appointment of **W. O. Lippman** as assistant to the president of West-



inghouse Electric & Mfg. Co. in charge of the headquarters manufacturing department was announced recently. Mr. Lippman will continue as manager of the U. S. Naval Ordnance Plant

at Canton, Ohio, which is operated by Westinghouse.

Mr. Lippman, whose headquarters will be in Pittsburgh, succeeds **Ellis L. Spray**, who was recently elected vice president and general manager of Westinghouse Electric Elevator Co. in Jersey City, N. J.

J. R. Weaver, manager of the U. S. Naval Ordnance Plant operated by the company at Center Line, Mich., was named works manager of the East Springfield, Mass., works of the company's electric appliance division, succeeding Mr. Lippman.

F. G. Coggin has been appointed manager of the refrigeration division of Detroit Lubricator Co., effective April 1. He succeeds J. W. Krall.

In announcing the appointment, E. J. Doucet, general sales manager, said:

"Mr. Coggin takes over this work well prepared. He has been with Detroit Lubricator Co. for 18 years in a sales and administrative capacity and had close association with the refrigeration industry for the past ten years."

Henry J. Schwartau and **Barney Taft** have been named chief inspector and assistant chief engineer, respectively, of Universal Cooler Corp.



Mr. Taft

Mr. Taft returns to Universal Cooler after having served as development engineer for UCC in Detroit and Marion from 1945 to 1942. He recently was with the H. K. Ferguson firm of Cleveland (Ohio), engineering contractors and builders.

Mr. Schwartau, before coming to UCC, served successively with Hold-Kold as production manager, with the General Refrigeration division of Yates American Machine Co., Beloit, Wis., as plant superintendent; and with Kelvinator and Servel.

A. F. Scharer, who has been in charge of Servel's export business since 1929, has been named to direct the newly formed international division of the company. Headquarters of the division will be at 51 E. 42nd St., New York 17. In addition to Servel products, the new division will promote export distribution of a complete line of refrigeration fixtures of allied manufacturers.

L. K. Wright is now in charge of the refrigeration course conducted by the YMCA Trade and Technical School, 5 West 63rd St., New York City. He formerly was chief engineer for Refrigeration Corp. of America.

Ben H. McDougall has joined Superior Valve & Fittings Co. as representative in seven southeastern states; Tennessee, North and South Carolina, Georgia, Alabama, Mississippi and Florida. He is also a representative of Alco Valve Co. in this



area. Mr. McDougall entered the refrigeration industry in 1940 as a manufacturers' representative for Alco Valve and Marlo Coil Co., with headquarters in New Orleans. He joined Alco's engineering department in St. Louis in 1943, and last August returned to the southeastern territory as field engineer, with headquarters in Atlanta.

Robert Mallory, formerly branch manager of the Houston office, has been named manager of a new southwestern zone established by Minneapolis-Honeywell Regulator Co. with headquarters in Houston. The new zone will encompass the territory in the southwest formerly under jurisdiction of Atlanta, and will maintain offices in Houston, Dallas, Tulsa, and New Orleans. M-H now has offices in 47 U. S. cities.

Thurlo F. Johnson, who has been with the Norge division of Borg-



Warner Corp. since 1933, has been named national service manager. He succeeds **J. R. Cameron**, who has resigned.

Mr. Johnson joined the service department in 1935 as a national field service representative covering all Norge household appliances as well as heating and commercial products. In

Continued on page 50

ACCURACY of CONTROL

★ is not affected by
Temperature Changes in Surrounding Areas



8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

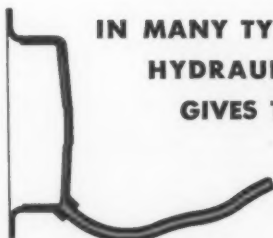
1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action principle incorporating solid-liquid-filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
- ★ 7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.



WHITE-RODGERS HYDRAULIC-ACTION REMOTE BULB CONTROLS ARE NOT AFFECTED BY CHANGES IN ROOM TEMPERATURE

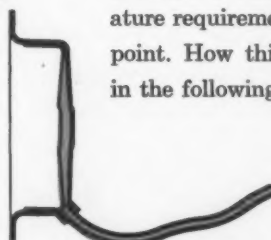
When controls must be located under difficult conditions, the remote bulb and capillary of White-Rodgers Hydraulic-Action controls provide the answer. The fluctuating temperature of the area in which the control is located *does not affect* the operation of the control. The design of the sensitive element, together with the expansive force of Hydraulic-Action, make this possible.

IN MANY TYPES OF APPLICATION THIS HYDRAULIC-ACTION PRINCIPLE GIVES THE ONLY SURE RESULT



CONTRACTED

Above is a cross section of the diaphragm and part of the liquid-filled capillary. In this view the liquid has contracted, releasing the pressure on the diaphragm and causing the switch contacts to function.



EXPANDED

In this cross-sectional view, the liquid charge of the capillary has expanded with a rise in temperature. The positive force of this hydraulic action forces the diaphragm outward and causes the switch contacts to function.

The remote bulb, containing the major portion of the solid-liquid charge, fully interprets the temperature requirements of the control point. How this works is shown in the following illustrations.

Actual-size illustration of the White-Rodgers diaphragm body, the actuating element of every White-Rodgers temperature control. It is so designed as to exert full pressure at the point of contact with the switch mechanism.



WHITE-RODGERS ELECTRIC CO.

1225D CASS AVENUE

ST. LOUIS 6, MISSOURI

Controls for Refrigeration • Heating • Air-Conditioning



ABOUT PEOPLE . . .

Continued from page 48

1939, he was appointed factory service superintendent, and at the start of the war was assigned to special war production duties.

He has been plant engineer in charge of maintenance since 1943.

Appointment of **James F. Pedder** as advertising manager and **Ellsworth Gilbert**



as sales promotion manager of the Frigidaire division of General Motors, has been announced by Lee A. Clark, assistant general sales manager.

All advertising, display, publicity, promotional and training activities for Frigidaire appliance, commercial refrigeration and air conditioning products, formerly the responsibility of four different departments, now will be centered in two newly created departments—the ad-

vertising department and the sales promotion department, under the direction of Mr. Pedder and Mr. Gilbert respectively.

Mr. Pedder held the prewar position of assistant advertising manager, and more recently was advertising and promotion manager of the Frigidaire appliance division.

Mr. Gilbert was formerly sales training manager of the company's appliance division.

John A. Schenk has been named field engineer in the Chicago office of



Alco Valve Co., which has recently been reopened.

Mr. Schenk previously managed Alco's Chicago office from

1936 until it was closed by war restrictions in April, 1942. Since that time he had been at the home plant in St. Louis, where he handled priority material allotments, production coordination, and later served as application engineer.

John P. Johnston has joined the Weatherhead Co. as refrigeration engineer for the West Coast office in Glendale, Calif., J. A. Strachan, refrigeration division manager, has announced.



During the past five years, Mr. Johnston was engaged in design Douglas Aircraft Co. of California, where he conducted research on the application and design of equipment for heating and air conditioning aircraft. Prior to that connection, he spent six years with Carrier.

C. Fred Hastings has been appointed general sales manager of American Central Mfg. Corp., Connersville, Ind. Byron C. Wagner succeeds to Mr. Hastings' former position as assistant general sales manager.

"CHANGE-OVER" COMMENT

Editor, REFRIGERATION INDUSTRY:

Referring to the introductory paragraph in the article by Alex Gordon entitled "Change-Over from 'Freon-12' to Methyl Chloride," (March Refrigeration Industry, page 24) would inform you of the facts. With the completion of the East Chicago, Ind., Works of Kinetic Chemicals, Inc. there was production capacity available at that works and Carney's Point, N. J., of five and one-half million pounds of "Freon-12" monthly, and on Jan. 29 Order M-28 was revised and the "forced conversion" features eliminated.

Adequate stocks of "Freon-12" are in the hands of all dealers throughout the United States if they ordered them, and consequently, there is no need of converting any equipment to the use of methyl chloride. Although appeals have been granted for quantities of "Freon-12" for air conditioning apparatus, these appeals have not all been cleared up to the present time. . . .

W. W. Rhodes, Sales Director
Kinetic Chemicals, Inc.

N UNIVERSAL USE
THROUGHOUT THE NATION

Stangard

PRIME SURFACE
COLD PLATES



STANGARD-DICKERSON CORP.
46-76 OLIVER STREET, NEWARK, NEW JERSEY

WHAT IS YOUR GASKET PROBLEM?

HIGH PRESSURE—LOW PRESSURE—HIGH TEMPERATURE—LOW TEMPERATURE
LIQUIDS—VAPORS OR CHEMICALS... FITTING STYLE OR MAINTENANCE QUESTIONS

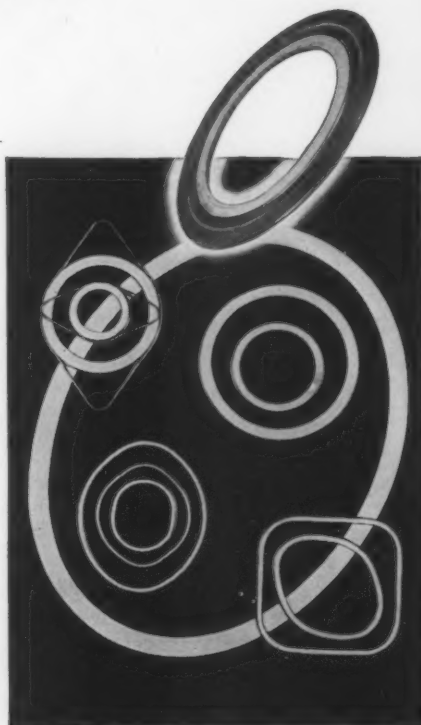
Nothing pleases us more than an opportunity to prove that Flexitallic Gaskets can handle sealing jobs better than they've ever been handled before — and far better than is possible with either conventional or so-called "special" gasket types. That has been our sole job for 33 years.

No other gasket can seal so perfectly because no other gasket incorporates the design features which make Flexitallic supreme for difficult applications. Spiral-wound construction automatically compensates for pressure surges, vibration, expansion, contraction. Bolt tension is controlled by gasket yield. Seal with Flexitallic — and it stays sealed.

FLEXITALLIC GASKET COMPANY
8th & BAILEY STS., CAMDEN, N. J.

"Flexitallic"

REG. U. S. PAT. OFFICE



Flexitallic Gaskets are regularly supplied in styles for American standard flanges and pressure vessels of all types and for extreme pressure and temperature ranges. Our engineers welcome the opportunity to acquaint you with the possibilities of these unique gaskets for your applications.

THE ORIGINAL SPIRAL-WOUND GASKET... MADE ONLY BY FLEXITALLIC

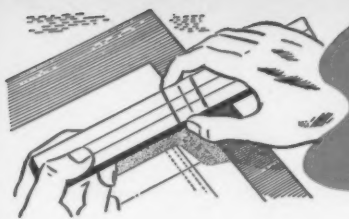
BONNEY "JOB DESIGNED" TOOLS



• This complete line of hand tools is designed the way mechanics like them—tailored to fit each specific servicing job. They combine strength, light weight and proper balance to help you do your work quickly, easily—well. Bonney tools are sold exclusively through jobbers and distributors from coast to coast.

BONNEY FORCE & TOOL WORKS
719 N. Meadow St. Allentown, Pa.
In Canada: Gray-Bonney Tool Co., Ltd. Toronto
St. Clarens & Royce Aves.





New PRODUCTS

"Lo-Volt" Test Glo

A new circuit tester called the "Lo-Volt" Test Glo, intended for testing circuits from 5 to 50 volts, is announced by the Ideal Commutator Dresser Co., Sycamore, Ill.

It simplifies the testing of open circuits, burned out fuses, and can be used for indicating the relative value of line voltage.

The incandescent "glow" lamp is protected by a transparent plastic housing. Overall length is 7 inches. It is compact so it can readily be carried in the pocket. Fully insulated test leads are 4 inches long.

The tester is suitable for refrigeration, automotive, and aircraft mechanics and electricians.

Walk-in Freezer

A "walk-in" frozen food locker with 160 cu. ft. capacity has been developed by Beall Pipe & Tank Corp., Portland, Ore., for postwar sale to homes, farms and restaurants.

The unit has two compartments: the



first a separate freezing chamber of 60 cu. ft. at zero and the second a 100-cu. ft. section at 38°F.

Outside cover is aluminum, and inside in aluminum lined; hardware is rustproof. Top, sides, wall and base have 6 inches of insulation, with sections joined and sealed for minimum heat loss. The unit is powered by a 1½ h.p. compressor. Freezing chamber, separated from the regular

storage area by a full length door, has five sharp-freeze plates with temperatures of 20 to 30° below zero.

Temperature in both compartments is thermostatically controlled.

Built in sections, the units can be assembled in any suitable interior, and can be enlarged by adding more sections. Experimental models have been in use for four years, the company claims.

Locker Room Thermometer

To meet the increasing demand among food locker operators for an accurate record of temperatures main-

*Refrigeration
AND AIR CONDITIONING*

YOU will find NIBCO WROT Fittings, return bends and tubular parts mighty useful in laying out air conditioning or refrigeration equipment. In many cases, instead of having to buy a special part, you will find what you need in our standard line...tees, elbows, couplings, reducers, adapters, crosses, return bends, hangers...more than one thousand items and sizes are listed in Catalog 613. If you do not have a copy, write for it today.

NIBCO WROT *Copper Fittings*

NORTHERN INDIANA BRASS CO.
ELKHART, INDIANA
VALVES AND FITTINGS SINCE 1904



You Can Bail Water Out of a Boat, but...

... you'll never do a job with inadequate measures.

Nowadays, when refrigeration service engineers can't take care of all their calls, if they could finish each job quickly and get on to the next one, their toughest problem would be solved.

TZ will help the R.S.E. Many calls are moisture cases. If he puts in TZ, starts the unit and goes on to the next job, nine out of ten such cases will be finished with the one call. Occasionally another "shot" will be necessary to take care of unusual moisture. TZ technique means time saved and more ground covered, expenses cut and more profit made.

Destroys Moisture and Neutralizes Acid Chemically

THAWZONE

Fully Protected by U. S. Patents
The PIONEER FLUID DEHYDRANT

HIGHSIDE CHEMICALS CO.

195 Verona Ave.,
NEWARK 4, N. J.

AMANA HOME FREEZERS

THE COMPLETE LINE

With Amana you are READY to cash in on a GREAT NEW APPLIANCE MARKET. The three modern AMANA FREEZERS fit the needs and pocketbooks of ALL USERS. GET FACTS on AMANA. It's a good name to be associated with. Write or wire.



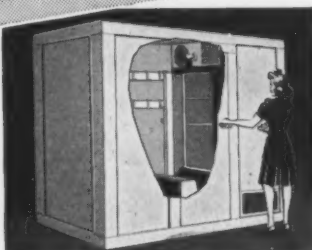
Refrigeration Division

AMANA SOCIETY
AMANA, IOWA

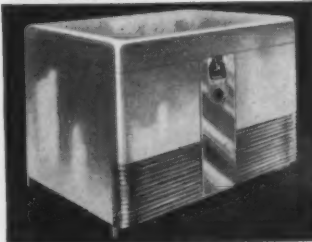


Model 50
5 CU. FT. CABINET.
Accessible... convenient... counter-balanced lid. No waste space.

Model 90
9 CU. FT. CABINET.
Full view counter-balanced top. Contents easily accessible. 100% usability of storage space.



Model 200 Freezer - Cooler
A complete private Locker Plant.
23 cu. ft. sharp freezing capacity.
120 cu. ft. Cooler.



tained in the cold room, Taylor Instrument Companies, Rochester, N. Y., has developed a recording thermometer specially designed for this purpose.

The stainless steel tubing which connects the bulb to the instrument is so constructed that bulb temperatures are transferred to the instrument without effect from the temperatures through which the tubing passes, it is said. As a result, every variation in cold room temperature is accurately recorded on the reverse scale chart, no matter where the instrument is located.

Light-weight Blower

A new light-weight blower for heat dispersion, the Model No. 2½, has been added to the line of the L. R. Mfg. Co., division of the Ripley Co., Torrington, Conn. The one-piece housing with aluminum motor plate is 4½ inches from top to bottom. Operating under all conditions of climate and temperature the unit, which weighs but 3½ ounces, delivers 50 c.f.m. at 8000 r.p.m. It is available

Continued on page 57

AMINCO OIL SEPARATORS



Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from ½ H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

AMERICAN INJECTOR CO.

1401 - 14th AVE. DETROIT 10, MICH.
Van D Clothier, 1015 E. 10th, Los Angeles
George J. Boone, Rm. 730, 1775 Broadway, New York
W. H. Gedy, Santa Fe Blvd., Dallas
Export: Borg-Warner, 310 So. Mich., Chicago



Over the COUNTER

WE'VE been havin' some terrific snow—and then water—out this way the last couple of weeks, so I haven't had much chance to circulate around among the boys and find out what's goin' on. But the other day Mike Black—he runs a shop with four men in it besides himself—brought me in a problem that I think we're all familiar with, but maybe haven't done much about.

It's a problem that's especially with us during these days of manpower shortages, but we all had it with us before the war, and we'll have it, I hope, as long as we're in this business.

It's the problem of the new, or "green", service man—the fellow you hire to learn the business and whose first job is to straighten and sort out junk, sweep floors, clean benches, etc.

Pretty soon you put him to work tearing down the old compressors you take in, and cleaning and painting



them so they'll be ready for re-assembling. Next you'll likely send him out to help occasionally on installations, to give him an idea of how a complete refrigeration system looks when it's finished, and a general notion of how it functions right from the beginning.

This way, he finds out how joints are flared, soldered and cleaned; how tubing is run, how it's fastened to ceilings or walls, how panel valves are mounted, and a lot of other things like that.

In other words, he gets a chance to

see the job operate before he leaves—something he doesn't see in the shop; he sees purging operations, refrigerant added, how to detect leaks.

But sometimes, I think, we think of these new men too long as "beginners"; we don't give 'em a real chance to show their stuff.

Of course, all of us were beginners at one time, too; but if we'd been stuck at the same routine day after day we'd have come along pretty slowly, I can tell you.

What we ought to do, after the new man's spent about six months breaking-in on jobs like I've mentioned, is to give him a kit of tools and put him out on minor repair calls—replacing belts, motors, and maybe even settin' controls.

This'll give the new man confidence—and if he's got the stuff, the will to get ahead. Sometimes a man will flounder around for a year on odd jobs around the shop, just because the boss has never taken the trouble to find out what he can do. Send him out on some calls by himself—and bingo! you find you've had a whiz on your hands and didn't know it.

When he goes out by himself, you ought to furnish him with a list of service hints, and the reasons for them, to see that he gets off O.K.

Things like the boiling points of the different refrigerants, and the speed of different compressors—specially handy today when you're changin' over from one gas to another.

There must be thirty or so tips you can give him to help him do a better job right from the beginning; checkin' belts, fuses, temperature of fixtures, linin' up the compressor, cleanin' the motor commutator—these are just a few. And you can tip him plenty about how to handle the customers, too.

Nowadays we need to bring along our new men as fast as we safely can—and I'll bet this scheme will help you, plenty, if you'll give it a try.



Mr. Tops, the Paragon symbol of top quality

Automatic time controls are speeding production...

...multiplying manpower efficiency... and saving countless hours in thousands of plants in scores of industries. Submit your timing problem to Paragon... your top source of time controls.



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800 Series



700 Series



2500 Series

ONLY \$13.00 LIST—300 Series self-lubricating time switches are accurate and durable for controlling stokers, oil burners, blowers, pumps, valves, air conditioning, etc. America's leading time switch value.

TIME DELAY RELAYS—The time cycle of Paragon synchronous motor operated, instantaneous reset type relays is unaffected by vibration or changes in ambient temperature. For motor and tube protection.

7-DAY TIME SWITCHES—... are designed for presetting heating or ventilating schedules on a weekly basis with independent daily operations.

MANUALLY PRESET TIMERS—The 2500 series is designed to close or open a circuit at the end of a preset interval, such as attic fan control.

All these units are designed and built by Paragon... a pioneer in the automatic timing field. Send for complete bulletin.

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Automatic control and regulating valves for Freon, Methyl Chloride and Ammonia. A large variety of sizes and types available for practically any refrigeration requirement.



WL water regulating valves for Freon, Methyl, or Sulphur. $\frac{3}{8}$ " orifice and $\frac{1}{4}$ " FPT. Brass body construction. Large capacity—no chatter.

WP water regulating valves are available in $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " FPT sizes. Brass body construction for Freon, Methyl or Sulphur. Easy adjustment.



WK water regulating valves are De Luxe Pilot Operated Modulating valves. Iron body, simple adjustment. Available in sizes ranging from $\frac{1}{4}$ " to 2" FPT.

WR regulating valves for Ammonia are diaphragm operated and highest quality corrosion resistant materials are used. Available in sizes ranging from $\frac{1}{4}$ " to 2" FPT.



Electrimatic valves are individually tested for efficient, economical operation. Trouble free performance.

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The MARKET Place

The rates for this department are as follows: minimum charge—\$2.00, 25 words. Each additional word, 10c.

Bold type or all capitals: minimum charge—\$3.00, 25 words. Each additional word, 15c.

Box number or address not included in word count. All classified advertising payable in advance.

Address all communications to this department:

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DEPARTMENT
THE REFRIGERATION INDUSTRY
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CLEVELAND 15, OHIO**

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Complete overhaul service on pressure, altitude, retard, compound retard, ammonia, freon and hydraulic gauges. Mail direct to Scientific Instrument Service, 3025 $\frac{1}{2}$ Riverside Drive, Burbank, California.

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WANTED TO BUY

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 - 2—Used 25 HP Air Conditioning Units
- All to be complete with condensing units, compressors, and coils.
INTERSTATE MACHINERY CO., INC.
1431 West Pershing Rd.
Chicago 9, Illinois

EQUIPMENT FOR SALE

500 RE-MANUFACTURED
Frigidaire and Kelvinator $\frac{1}{2}$ — $\frac{3}{4}$ —1 and $1\frac{1}{2}$ H.P. AIR COOLED Condensing units with new condensers and new single phase 110/220 60 cycle motors. 2 to 12 holes Ice Cream Cabinets. Write for list and prices.
EDISON COOLING CORP., 310 E. 149 St., New York, 51, N. Y.

ARIZONA REFRIGERATION JOBBER CHANGES NAME

W. C. Miessemer, who has been an active stockholder in the J. Carl White Co. for the past four years, has announced that he has closed negotiations for the entire interests of the company.

The new name of the corporation is Arizona Refrigeration Supplies, Inc., 231 South Central Ave., Phoenix. Well known refrigeration equipment and supply manufacturers will be represented in the lines carried.

ADMIRAL TO EXPORT THROUGH AURIEMA CO.

Exclusive export rights for the complete post-war line of Admiral Corp. of Chicago have been granted to Ad Auriema, Inc., 89 Broad Street, New York City.

"I WANT A JOB"

A FREE WANT-AD SERVICE FOR RETURNING FIGHTING MEN

DISCHARGED NAVY VETERAN who attended Naval refrigeration school and was in charge of equipment aboard ship would like permanent job in refrigeration industry. High school graduate; mechanical experience prior to enlistment. 28 years old, married, two children. Box 4452, Refrigeration Industry.

VETERAN WOUNDED on Anzio beach is interested in getting mechanical training. Able to go to work now. Disability retards action of left arm above head; left eye o.k., right eye 24/100. Age 23, three yrs. high school. W. Va. preferred. Box 4454, Refrigeration Industry.

SITUATION AVAILABLE

SALESMANAGER, or man with sales experience who feels he has the ability and ambition to become a salesmanager. Successful company manufacturing controls for commercial refrigeration and domestic oil burning equipment. Some experience valuable but not necessary if you have ability to understand mechanical or technical products. Company now engaged exclusively in war work on many prewar products vitally needed and used in war effort. Box 4451, Refrigeration Industry.

BUSINESS OPPORTUNITY

REFRIGERATION SERVICEMAN to go in business for himself, shop and 3 rooms next door to us. We alone will give you plenty of work, also will finance reliable commercial mechanic, if you are looking for a future. Box 4455, Refrigeration Industry.

STORE MODERNIZING MANUAL

Suggestions for store modernization, a subject of interest to many merchants throughout the nation, are contained in an illustrated manual, "Modern Stores," just issued by the National Retail Furniture Association. Basic ideas for modernizing a store when construction is again permissible, are outlined. While the 160-page handbook (price: \$2.50) emphasizes furniture store planning, the ideas are applicable to other mercantile establishments.

ALBANY OUTLET NAMED

Tri-State Distributors, Inc., has been appointed Admiral distributor for the Albany, N. Y. territory. Philip S. Dorton is president and Charles G. Houghtaling is sales manager of the company.

NEW PRODUCTS . . .

Continued from page 54

with shaft bores of either .1895 inch or $\frac{1}{4}$ inch.

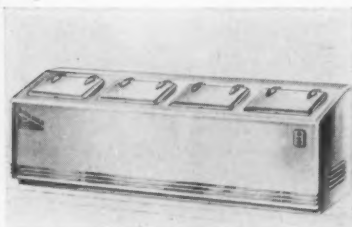
With the addition of this new model to its line the L. R. Co. now



has available blowers ranging in size from 3 inches to 6 $\frac{1}{2}$ inches with weights from 2 ounces to 12 ounces and with capacities ranging from 15 c.f.m. to 270 c.f.m. at 8000 r.p.m.

Farm Freezer

Milk Producers Equipment Co., St. Louis, has announced a line of low temperature cabinets for postwar pro-



duction. The units, according to present plans, will be manufactured in sizes ranging from 5 to 35 cu. ft.

Under the trade name "Shurkold", the company markets milk coolers, dry storage cabinets, walk-ins, and other equipment for milk producers.

Temperature Controller

An electronic-type resistance thermometer for indicating, recording and controlling temperature between -100°F. and 1,000°F. has been announced by Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland.

Reliable performance and accurate calibration over long periods of continuous operation are said to result from its sturdy design. A 29-inch indicating scale which circles the chart may be read easily from 50 feet away.

Indicating, recording and controlling mechanism are all driven by the same reversible electric motor.

Dehumidifier

A new dehumidifying unit has been announced by the General Air Conditioning Co., Oakley, Cincinnati. It consists of a three-stage terraced receptacle to which is fed cubed dehumidifying agents. These cubes liquefy when they absorb moisture, and this liquid is caught in a bottom trap. It is claimed that the cubes, which are 1 $\frac{1}{2}$ x 2 inches in size, do not fuse together when dissolving, permitting a more effective circulation of air through them until they are entirely dissolved. A single unit will serve from 800 to 1,000 cu. ft. of space.

All-Angle Magnifiers

Newest additions to Ullman Products Co.'s line of magnifiers are three all-angle, illuminated models, two of them stand types and the third a portable hand type. Stand model 410 and portable model 610 have incandescent tubes, and stand model 210 uses fluorescent tubes.

All objects are magnified twice up by a $\frac{1}{2}$ inch double convex lens, ground and polished. Units are strongly built of aluminum and steel.

Why the Trend Is Strong to CHICAGO SEALS and VALVE PLATES



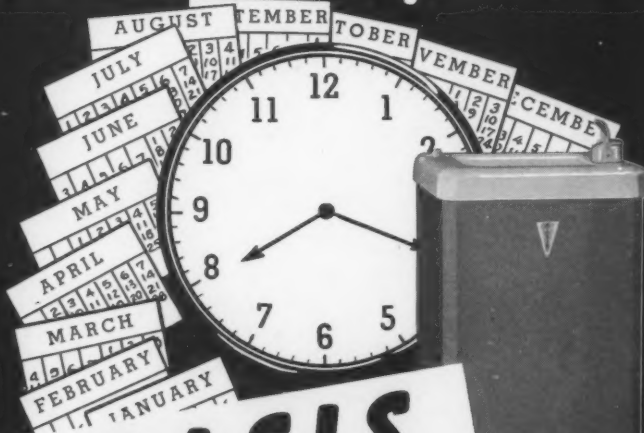
CHICAGO GENERAL REPLACEMENT SEAL

ONE OF CHICAGO'S VALVE PLATES

Chicago Seals and Valve Plates make a better servicing job on all refrigerators, in less time, at less cost, at more profit . . . and more service men and more jobbers are finding out this fact every day.

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THE REFRIGERATION INDUSTRY

CENTRAL STATES JOBBERS HOLD FIRST MEETING

First meeting of the Central States Refrigeration Supplies Jobbers group was held Feb. 23 at Hotel Stevens, Chicago. Jack Glass, of Chase Refrigeration Supply Co., was named chairman of the group, and the next meeting was scheduled to be held on March 30.

Present at the meeting, besides Mr. Glass, were:

H. S. McCloud, executive secretary of NRSJA; Irving Alter, Harry Alter Co.; H. W. Blythe, H. W. Blythe Co.; L. C. Keeley, Airo Supply Co.; J. B. McGuan, Automatic Heating & Cooling Co., all of Chicago; Gustave A. Larson, Gustave A. Larson Co., Milwaukee; P. Ravanesi, Service Parts Co., Melrose Park, Ill.; and Dick Potter, U. S. Electric Co., Springfield, Ill.

NEW A.S.R.E. SECTION IN CONNECTICUT

A new Connecticut Valley section of the American Society of Refrigerating Engineers has been formed to include members from Western Massachusetts, and all of Connecticut north of Bridgeport.

Officers of the new section are: A. W. Towson, Worthington Pump & Machinery Corp., chairman; R. H. Tull, Westinghouse Electric & Mfg Co., and Mert Allan, American Brass Co., vice chairmen; John K. Campbell, Bush Mfg. Co., secretary; and Joseph Simons, Joseph Simons Co., treasurer.

Publicity committee members include S. R. Osborne, Chase Brass & Copper Co.; C. P. Payson, C. P. Payson Co., and Bertram Butler, Bush Mfg. Co.

Meetings will be held in Springfield, Mass. and Hartford, alternating between the two cities each month.

DAY & NIGHT MFG. CO. JOINS DRESSER GROUP

Negotiations have been completed and approved by the stockholders of Day & Night Mfg. Co., Monrovia, Calif., for the affiliation of that company with Dresser Industries, Inc.

Dresser Industries, composed of a group of companies joined together by common ownership, serves chiefly the gas and oil industries.

In the appliance field, Bryant Heater Co., Cleveland, has been a member company of Dresser since 1933.

Day & Night has been in business since 1909, as a manufacturer of electric water and beverage coolers and gas water heaters.

THE PRACTICAL Refrigeration Engineering MANUAL . . . by Harold Smith

VII. Frozen Food Processing (Cont.)

Food coming out of the aging cooler is taken to the processing room, where it is cut up and prepared for freezing. If the processing plant is a locker storage plant, the food is processed into retail cuts or packages, as requested by the locker renter, who is usually the owner of the products being processed.

If the processing plant is commercially operated, the processing follows a standard packaging arrangement regularly employed by the operator. In the processing operation, the product is cut to size and wrapped in individual packages. A special moisture resisting wax paper is used to hold the moisture in the product.

HANDLING VEGETABLES

If vegetables are being processed, the procedure is somewhat different. The product is taken to a room for washing, grading and then is cut up for further processing. Vegetables are put through a blanching or hot water treatment to stop the enzyme or ripening action before freezing. The product is then placed in containers specially designed for this use.

Fruits and berries are usually prepared in a syrup, however they are also frequently packed dry, with sugar added to the product. Special containers are used for all fruit products. All packages are labeled so that the exact contents are known, and they are then ready for the freezing operation. No refrigeration is used in the processing operation.

In order to secure a superior product, it is very essential that the freezing be done quite rapidly. This requires a low temperature and is usually augmented by using a forced circulation of

air and direct contact with the freezing unit when possible, so as to utilize the principle of conduction rather than the slower method of convection.

When possible, the freezing cooler should be located so that its four walls are surrounded by the other coolers. This is desirable because of the low temperature used in this cooler, and by using the walls of the other coolers the temperature differential is decreased, resulting in a much lower heat leak load.

CUT BUILDING COSTS

Another great advantage in this is the saving in construction costs, as some of the walls become common walls, serving two coolers. If possible, the entrance door to the freezer cooler should be within a refrigerated space; when this is not possible, a vestibule can be used advantageously.

This reduces the service load in and out of the cooler, and eliminates the fog that occurs when the cold air from the freezing room is thrown into warmer outside temperatures. It is a good practice to design the freezer room with a low ceiling, and just large enough to handle the job satisfactorily, with some allowance for future growth or expansion. Such planning cuts the refrigeration load to a minimum.

SPECIAL EVAPORATORS

There are a number of special designed packaged evaporators made for quick freezing rooms. These can be secured in various capacities, and usually employ the forced air principle of circulation. Bare pipe stands are often used, and freezer plates are particularly well suited and popular for this work. Most plate manu-

LATIN AMERICAN NORGE OUTLETS IN MEETING

Mexican and Central American distributors of Norge commercial and household appliances met with officials of the company in Mexico City recently to lay plans for full-scale resumption of trade as soon as conditions permit, reports Arch Black, manager of Norge export sales. Eleven from Mexico were represented and distributors from Guatemala, El

Salvador and other Central American republics attended also.

TWO MORE "E'S" FOR PHILCO

In recognition of their war production records, the Philadelphia plants of Philco Corp. and the Simplex Radio division of Philco in Sandusky, Ohio, have just received the 17th and 18th Army-Navy "E" awards made to the company.

facturers sell stands to install the plates on, so that they can be used as shelves. This is efficient and very convenient.

With the plate installations, it is always advantageous to use a fan to circulate the air. The plate efficiency is greatly increased by so doing, and the process of removing heat is speeded up to a decided degree. The fan can be operated from a separate switch, and turned on only when the freezing operation is in progress.

PLATE TEMPERATURE

A plate temperature of from minus 20 to minus 30° F. is most desirable in the freezing operation, although some freezing is done at higher temperatures. When plates are used, the space between plates should vary, so that different sized packages can be placed on the shelves with close as possible contact to the shelf above, as an aid to the overall efficiency of the freezing operation.

In laying out the engineering recommendations for the condensing units, it is well, whenever possible, to use a separate unit on each of the coolers carrying the fresh food or higher temperatures. Then use a condensing unit to handle the freezing, and one to take care of the low temperature storage or locker room, depending on the type of processing plant.

LOWER COST JOB

Should this arrangement involve too great an investment, a second choice would be one condensing unit on the two higher temperature rooms, and one to take care of the freezer and storage or locker room. In all cases, tie the liquid and suction lines together, through hand shutoff valves, so that any of the condensing units can take over the work of one that goes out of operation.

The use of condensing units as above suggested eliminates the use of temperature control valves and difficulties in getting adjustments of satisfactory temperatures in the various rooms. The job of course can be satisfactorily designed to use a single condensing unit on the entire job, but on such an installation very careful engineering calculations must be made, and great care must be used to balance out the evaporators and the liquid and suction lines to the different units.

The freezer storage room or locker room, as the case may be, is usually the largest cooler in the plant. In this room the frozen product is accumulated until sold or taken out by the locker renter for consumption. With a large area involved, the use of forced air circulation is often considered desirable.

FORCED-AIR UNITS

The advantages of using forced circulation, however, are greatly offset by the difficulty of keeping forced air evaporators defrosted. Because of the low temperatures used, usually from 0 to minus 10°, the coil surfaces ice up very quickly, and the efficiency of the forced air evaporator drops sharply as the air flow becomes restricted. It is not unusual for daily defrosting to be required, in order to get the maximum efficiency out of this type evaporator.

There are two common types of defrosting units used for this purpose: electrical heaters and water defrosters. At such low temperatures the water, unless handled exactly right, will partially refreeze over the coils. The electrical unit, on the other hand, requires closing up of the evaporator, and also injects considerable additional heat into the room.

Continued next month

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THE REFRIGERATION INDUSTRY

NEW REFRIGERATION FIRM IN CLEVELAND

A new company, Allied Refrigeration Engineering Co., has been organized in Cleveland through consolidation of firms which formerly had been operating in the area. Headquarters are at 1635 E. 55th St.

Principals in the new company are Gerald T. Hasmann, formerly with Oil Heating Devices; Glen Keller, of Keller Refrigeration Service Co., and Ernest W. Farr, Jr. and Emil Flanick, of Lake Erie Refrigeration Co.

In addition to handling installation and servicing work, the new company also will merchandise Carrier commercial refrigeration equipment.

NEW SUPPLY FIRM IS ORGANIZED IN BOSTON

Supply Distributors Corp., a new firm organized to wholesale refrigeration parts and supplies in New England, has recently opened with headquarters at 167 Brighton Ave., Boston. Officers of the new firm are Hillis Iams and Richard R. Seddon.

Mr. Iams, who will manage the new firm, has been with Mills Industries since 1935 as a field engineer and district sales manager, most recently as government contract representative in Washington, D. C.

Mr. Seddon, organizer of Miller & Seddon Co., has been active in the refrigeration field since 1927, and was with Mills as field engineer and sales department member. Both men are ASRE and RSES members.

TO COVER CAPITAL AREA

United Distributors, Inc., Washington, D. C., has been named distributor of Admiral products in this territory. Joe Mass heads the company, and Joseph A. Doyle is vice president in charge of the appliance division.

Service Engineers Should Know ...

How To Determine The Approved Maximum Filling Capacity Of An Empty Cylinder.



1. Refer to the I. C. C. classification number stamped near the top of the cylinder. Any of the

following can be used for transporting Sulfur Dioxide, Methyl Chloride, "Freon-12" and "Freon-22": (ICC-3A-300; ICC-3B-300; ICC-4A-300; ICC-4B-300; ICC-4; ICC-25; ICC-38; ICC-26-300.) If any other number is stamped on cylinder, consult Bureau of Explosives before using in refrigerant service.



2.

Examine the hydrotatic test date which should be within the prescribed 5 year period. If last test was made more than 5 years ago, send the cylinder for retest to a refrigerant manufacturer or an agency authorized to conduct such tests.



3.

Open valve to remove any residual pressure. Remove valve, weigh the empty cylinder; fill completely with water and reweigh. Deduct empty cylinder weight from water-filled weight to obtain net weight of water.



4.

Calculate the approved maximum filling capacity by multiplying the net water weight:

- by 1.25 for SO₂
- by 0.75 for Methyl Chloride
- by 1.19 for "Freon-12"
- by 1.08 for "Freon-22"

Caution: Be sure cylinder is clean and dry before refilling with refrigerant.

Manufacturers of "Virginia" Refrigerants and Agents for Kinetic's "Freon-12" — "Freon-22" — "Freon-11"

VIRGINIA Smelting Co.

WEST NORFOLK, VIRGINIA

78 BEAVER ST., NEW YORK 5 • 131 STATE ST., BOSTON 4

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3. Commercial and Industrial Refrigeration
4. Air Conditioning Systems

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Here you have at your fingers' ends a Complete Library in ONE VOLUME, the necessary data you have been looking for on: MODERN UNITS, SYSTEMS AND MACHINES, REFRIGERANTS including Freon, Quick Freezing, Lockers, Water Coolers and Air Conditioning Systems.

AUDELS REFRIGERATION and AIR CONDITIONING GUIDE

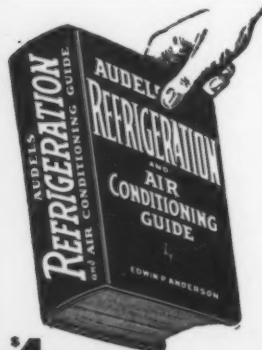
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MAIL AUDELS NEW REFRIGERATION GUIDE for free examination. If O. K., I will send you \$1 in 7 days; then remit \$1 monthly until price of \$4 is paid. Otherwise I will return it.

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CORROSIVE LIQUID

Write for descriptive
literature or
consult your
local jobber

Standard Solvent Co.
4740 Woodlawn Ave.
Chicago

QUIET PLEASE . . .

Continued from page 20

flow arrangement for the easy movement of equipment.

Inside the room were mounted recording charts and an exhaust fan to the outside air, with control switches both inside and outside of the room for its operation. A separate vacuum line was installed in the room with gauges and hand valves. The vacuum pump was installed outside the room.

All condensing units and refrigerators are completely tested under actual operating conditions, with correlation between room temperature and gas pressure. Recording charts are used for each test. Equipment is tested for noise level in a manner which cannot be accomplished in any other fashion than in a quiet room. The expense of construction is not great and the results achieved are well worth the expenditure.

THERMOMETERS A "MUST"

Installation of recording thermometers in all of the 433 locker plants in Washington state is now mandatory.

INDUSTRY MAN AWARDED MEDAL OF HONOR

LIEUT. CHARLES W. SHEA, Jr., who before entering the armed services was an employe of Everlast Refrigeration Co., New York City, has been awarded the Congressional Medal of Honor for exceptional gallantry and bravery in action on the Italian front.

It is believed that he is the first person directly associated with the refrigeration industry to be awarded this nation's highest award for valor.

A 23-year-old Bronxite, known to his neighbors as "Red", Lieut. (then Sgt.) Shea was awarded the Medal of Honor for exceptional gallantry and bravery on an enemy-held hill outside Rome last May. Finding himself surrounded by machine gun emplacements, he calmly and skillfully cleared out three nests with rifle and hand grenades, and then captured the hill against much larger German forces.

He was promoted to the rank of lieutenant in the field. In his honor, Feb. 8 was set aside as "Lieut. Charles W. Shea, Jr. Day" in his home city, with an appropriate ceremony in the Veterans' Memorial Hall of the Bronx County Building.

THEY FLOAT . . .

Continued from page 19

the temperature is kept at 40°F. Refrigeration here is by a Kohlenberger heat transfer unit with cold air blower.

The refrigerating plant itself includes four Kohlenberger Pacific compressors, diesel-driven, and Kohleco condensers and receivers, in addition to all necessary piping and controls. The plant was designed and furnished by Kohlenberger Engineering Corp.

The refrigerant, Freon gas, is conducted, after it is compressed into condensers through which salt water is circulated, thereby cooling and condensing the gas into a liquid. From the receiver, the liquid passes through a drier, then is conveyed through copper tubing to a solenoid

LET ME SPOT YOUR HARD
TO FIND LEAKS—YOU CAN'T
FIX 'EM 'TIL YOU SEE 'EM

VISOLEAK

is a finely-treated colored refrigerant oil which penetrates every nook and cranny of the system. The leak is indicated by a red stain—just like the discoloration on a carburetor in which ethyl gasoline has been used. Can be used safely and effectively with any type of refrigerant.

See your jobber today. If he has not stocked Visoleak write for complete information.

WHOLESALE PRICES		CASE LOTS	
4 ounce bottle	\$ 1.00	48 bottles	
8 ounce bottle	1.75	24 bottles	
1 pint bottle	3.00	12 bottles	
1 quart bottle	5.00	6 cans	
1 gallon can	16.00		
SAVE 10% ON CASE LOTS			

WESTERN THERMAL EQUIPMENT CO.

5141 ANGELES VISTA BLVD.
LOS ANGELES 43, CALIF.

valve operated by thermostatic control.

The liquid then goes into the cooling coils, where it is again regulated by a thermally controlled valve and passed into large cooling coils, where it expands and cools off the atmosphere and absorbs heat. The round-trip is started again by a return to the



Welding on refrigerant piping.

compressors—three of which operate simultaneously, with the fourth as a standby.

The two forward holds are operated in tandem off one compressor, and the two after holds by another compressor. The third operating compressor is used to cool the two refrigerated spaces in the deck-house.

The knockdown method of construction and shipment permits component sub-assemblies to be stored away on land near advanced bases until ready for use by the Army Transportation Corps' "small boat" fleet. They may be shipped to the assembly points overseas without having to be towed long distances.

The barges are equipped to operate for three consecutive months without refueling or rewatering, and have a capacity of more than 400 tons of perishables—indispensable items in the logistics of getting the right amount of supplies to the right place at the right time.

Construction of these "floating refrigerators" indicates the desire of the high command to provide its men with as close to a normal diet as is possible under the severe handicaps of front-line fighting.

All of these unique ships will see front-line action in the Pacific war zones. Moved into position during a landing operation on a Japanese-held island, they will be camouflaged and

serve as mobile refrigerators until permanent refrigeration equipment can be set up on shore. Then they will be moved to the next point of attack in the steady advance towards the home islands of Japan.

ABOUT FACE...

Continued from page 24

volt alternating house current through an ordinary electric range switch. Turning switch to the left gives various stepped-down voltages to the test leads, the current being sent through several screw-in type heating elements as resistors. The circuit is wired through a thermal relay cutout box so that if a short occurs the relay will throw on the bench, preventing blowing of fuses. Turning the range switch to the right sends the full 110 volts through the test leads and into the motor.

This eliminates much of the time-killing "breadboard" method of testing and wiring up motors temporarily, and allows repair men to follow a standardized procedure on all motor testing work.

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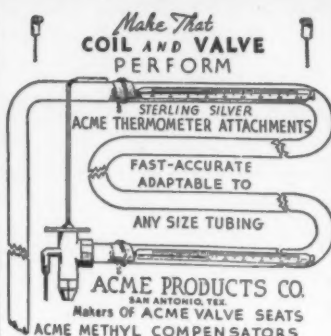
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WORLD'S LARGEST...

Continued from page 37

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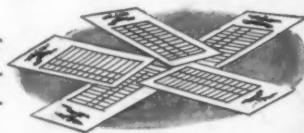
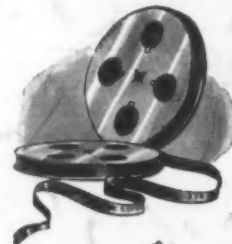
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